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BIOTECHNOLOGY IN PORTLAND

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

APRIL 5, 2002

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ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

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BIOTECHNOLOGY IN PORTLAND

FRIDAY, APRIL 5, 2002

U.S. SENATE,
SUBCOMMITTEE ON SCIENCE, TECHNOLOGY, AND SPACE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Portland, OR.

The Subcommittee met, pursuant to notice, at 9:30 a.m., in the Council Chambers of the Metro Regional Center, Hon. Ron Wyden, Chairman of the Subcommittee, presiding.

Staff members assigned to this hearing: Jean Toal Eisen, Democratic Senior Professional Staff; and Floyd DesChamps, Republican Senior Professional Staff.

OPENING STATEMENT OF HON. RON WYDEN, U.S. SENATOR FROM OREGON

Senator WYDEN. The Subcommittee on Science, Technology, and Space will come to order. I am very pleased to have a chance to be home and listen to the people of Oregon on this issue of special importance to the Oregon economy. And as Chairman of the Science, Technology, and Space Subcommittee, I am pleased to have a chance to convene this session this morning.

Next month, Portlanders and other Oregonians will mail in their ballots and make a major decision about the future of technology and biosciences, specifically, for our state. Ballot Measure 10, which I strongly support, will allow our universities and research institutions to reap dividends from products derived from the bioscience successes that they help to develop.

This measure is just one example of how Oregon can incentivize research and stay at the forefront of the technology revolution.

This morning, the United States Senate's Subcommittee on Science, Technology, and Space convenes a field hearing to explore the appropriate role for the federal government in our city's development of its biotechnology industry cluster and how this critical Portland initiative can serve as a model for our whole country.

Biotechnology is already revolutionizing both health care and agriculture, a sector that is marshaling its forces to help protect Americans from bioterror attacks, and we are going to examine a number of these issues this morning.

I am particularly excited about the health care possibilities that stem from biotechnology innovation and research.

The fact is, right in our community, there is an opportunity to revisit and be part of a revolution in fighting disease with research in the biosciences. As part of this research, Oregonians can systematically review and research major diseases that plague our citizens

and wreak havoc with their lives and then use that research to help change the world for so many people for the better.

Just for a moment, take the issue of monoclonal antibodies. With these new antibodies, this country and our state will have a new tool to fight cancer cells and just about any malignancy. I think back to my days as co-director of the Oregon Gray Panthers when I got started with our good mayor sitting in her living room in Portland talking about these diseases that are such a scourge for older people. I remember many seniors with rheumatoid arthritis and similar inflammatory diseases, horrendous diseases. Often, their hands curl. You think about the horrible physical consequences of these diseases, and a lot of them can be relieved dramatically by pharmaceutical products that are the products of the new biotechnology revolution, products that revolve around monoclonal antibodies.

I want to make it very clear this morning, as Chairman of this Senate Subcommittee, I am not going to sit around and let Oregon pass up the opportunity to take people with crippling diseases from their beds to the tennis court. The fact of the matter is, that is possible with important innovations in research in biotechnology.

The American public fully expects our country to continue as an acknowledged world leader in biomedical research. It's the expectation that the biotechnology industry will deliver, and Portland already has a foothold in this critical field. We have got experts here right now who are developing ways to administer drugs without needles, to deliver actual cells and proteins to target areas in fighting liver and heart disease, and also to promote improvements in agriculture and animal health.

So, today the Subcommittee is going to examine what Portland has to offer in the biosciences field to learn why some biotechnology entrepreneurs have already set up shop here. We also are going to examine the challenges that lie ahead. This Subcommittee has put considerable effort in looking at biotechnology issues, from the fight against bioterrorism to the potential of technology in healthcare, as I mentioned with respect to monoclonal antibodies and a variety of related illnesses.

Recently, we heard from biotechnology experts from across the country. They related difficulties they faced in offering new technology to the government in a number of areas, such as fighting the war against terrorism. In response, I have already written legislation to provide a portal for the private sector, including the biotechnology industry, to offer new anti-terrorism technology to our government.

This country has a Strategic Petroleum Reserve. It is, in effect, an insurance policy we have when we are dealing with problems that stem from a shortage in the oil field. I think it is time that we set up a Strategic Technology Reserve, that we have an opportunity to call on experts and companies to help, and for example, in most communities in this country, there is not even a data base of physicians and experts who you would call if the community was hit with a bio-terrorism agent. It seems to me that is something that we can set up all across this country. That is what I am proposing the government to do in legislation I have already intro-

duced, the Science and Technology Emergency Mobilization Act, that is already before the Subcommittee and the Congress.

For Portland and other communities to build on that portal and to be a portal for the biosciences, it is essential to provide academic facilities, research facilities, attractive communities, and economic assistance incentives to harness the industry's potential.

This morning, we are going to look at how the federal government can assist in each of those areas, particularly with the high unemployment rate we have got in Oregon, in Portland. And with too many Oregonians hurting, biotechnology is an opportunity that can be an economic anchor for our state.

Nobody disputes the opportunities in this field for biotechnology growth. Economic development follows that growth in a variety of areas, from accommodating educated professionals and families and numerous economic spin-offs that pay family wages for folks that are out of work.

I have announced my intention to make job creation my top priority in examining requests for federal funds for projects in Oregon. Paychecks are the primary need of thousands of our families, so they are going to be the primary focus that I have as we examine the request for appropriations.

Oregon communities, agencies, and organizations requesting funds are now being asked, not just how many jobs their program or project will create, but are those jobs going to create good wages and opportunities for our families? I think the biotechnology sector offers the kind of jobs Oregonians want and need, jobs that pay the good wages that are compatible with the spirit of Oregon. For a city dedicated to sustainable growth, social consciousness, and civic pride, biotechnology offers in Portland the chance to make significant contributions to the health and safety of our country and the world.

Our Governor has established a working group to study the access and capital needs of four industries in our state, including biotechnology. I commend the Governor's efforts. And I also want to note at this point the special efforts of our mayor, Mayor Katz, who is working hard to make the federal government a better partner in promoting biotechnology for our State and this community.

In closing, we are going to hear from today's panels how the federal government can help to develop the potential around us and the potential to make a Portland thriving biotechnology center for our country. The witnesses today include public leaders, biotechnology entrepreneurs, and academic experts who share that goal.

Today, we are going to hear from the Honorable Vera Katz, Portland's Mayor; Mr. Gil Kelley from the Portland Bureau of Planning; Mr. Bill Grinstein of Pacific Northwest National Laboratories; Dr. Denis Burger of AVI BioPharma——

Voice: How about some opponents of biotechnology?

Senator WYDEN. Let there be order in the room.

Voice: Opponents with a different perspective.

Senator WYDEN. I would like to make clear that today is a Senate field hearing. I would like to state for the record that I am doing something nobody has ever done in this state, and that is

holding open community meetings in every county in Oregon to hear from people, all sides. But today is a Senate——

Voice: Opposing voices today. The experts that are——

Senator WYDEN. The Subcommittee will come to order, and I am going to direct the staff to take those steps to ensure that the hearing can go forward.

Dr. Peter Kohler of the Oregon Health and Science University; Mr. George Pernsteiner of Portland State University; and Mr. Donald Mazziotti of the Portland Development Commission are here, as well.

Let us begin first by welcoming the Honorable Vera Katz, and she is accompanied by Mr. Gil Kelley of the Portland Bureau of Planning. We welcome both of you, and we look forward to your remarks.

STATEMENT OF HON. VERA KATZ, MAYOR, CITY OF PORTLAND, OR

Mayor KATZ. Senator Wyden, for the record, I am Vera Katz, Mayor of the City of Portland. Thank you for arranging this field hearing, and I want to welcome all of your staff and congressional staff to the City of Portland.

As you know, Portland is one of the most livable cities in this country. We worked hard to achieve, and we worked very hard to earn that recognition. At the same time, Oregon, as well as this city and this region, has one of the highest unemployment rates, as you said, in the country. Livability means nothing if people can't support families and find jobs.

Portland's strong economy during the last 10 years was due to our ability to respond to economic opportunities without losing our vision of the importance of a quality of life and a skilled work force. As we diversify our economy, we kept a strong manufacturing base that includes the growth in this region and in the State in high technology. We need to continue our economic diversification, build on our strength, but without sacrificing the quality of life that we so cherish here.

One of the largest employers located in the City of Portland is the Oregon Health Science University, and Dr. Kohler will describe the range of opportunities possible for their future and for ours.

OHSU has the potential for spawning products and services that can be developed right here and in this region. With the Health Sciences Center and Portland State University, the Oregon Graduate Institute that has merged with OHSU and the OSU, Oregon State University, the synergies for application for biosciences are limitless. Our goal is to have this emerging industry as a force in the state's economy. We have a plan. You will hear about it in great detail from Gil Kelley and Don Mazziotti.

We are preparing this city to position itself on the cutting edge of the biosciences movement. What this means for us is an infusion of high wage jobs, a knowledge-based industry that works and supports our institutions of higher education, and the opportunity to reclaim the banks of the Willamette River, the fish habitat and our citizens. The area that you will hear about is the 130-acre site in North Macadam. We call it the "Science and Technology Corridor."

It also includes the Health Sciences' main campus that employs 10,000 people and Portland State University's expansion of their engineering school. This site has a potential to grow and to take advantage of the intellectual resources of our universities and others in the community involved in the biosciences. That fits well with other new economy industries of high tech, creative services, and the fact that today—and we have branded ourselves as the urban center for a sustainable economy.

But this vision can only happen with focus and commitment, commitment of time, commitment of money. And it can only happen if we, as a local community, a region, State and the federal government, work together.

To accomplish this vision, we need your help. Funding for infrastructure, from streets to high-speed communication links, funding for transportation to continue our national leadership provided by this city and this region with your help and the help of your colleagues in development of public transportation, including the first modern streetcar ever built in 50 years in this country.

The geographic limitations you are going to hear about today require us to develop very efficient public transportation. We also need your help in the cleanup of contaminated soils in North Macadam as well as river restoration and development of the greenway along the Willamette River.

Making the biosciences part of our economic strategy is critical to the vitality and livability of Portland. The city, our private and public partners, are ready to work together to make this a reality. But Portland and the State of Oregon need your help.

Gil Kelley, the Director of the Bureau of Planning, and Don Mazziotti, the Executive Director of the Portland Development Commission, will provide you great detail on these opportunities and the needs of this community.

Thank you very much.

[The prepared statement of Mayor Katz follows:]

PREPARED STATEMENT OF HON. VERA KATZ, MAYOR, CITY OF PORTLAND, OR

Portland is the most livable city in the country. Something we have all worked hard to achieve and of which we are immensely proud. At the same time it currently has one of the highest unemployment rates of any region in the state, and Oregon has the highest unemployment rate in the nation. Livability ultimately means nothing if talented hard-working people cannot find quality jobs.

Portland's enormous positive growth of this last quarter century has been because of its ability to respond to economic opportunities without losing its vision of being a clean city with clean industry and a highly educated workforce. We have proven our ability to perform well in supporting a wide industrial base, including the huge growth of high tech industry.

But if our region is one of the hardest hit in the nation by this recent recession, then we need to intensify economic diversification, building on our strengths while not sacrificing our commitment to quality of life.

Nothing fits this vision of our future better that building on our strengths in biosciences, and on the nation's and world's need for the type of goods and services that can come from the critical work being done in the fields of health research and biotechnology in Portland.

As Dr. Kohler can tell you himself, the Oregon Health and Science University is a center of a wide range of research that can, if continued and successfully transferred to the private sector, have significant impact on the health of our nation and the world. It also has the potential for spawning an unlimited number of biomedical products and services that can and should be developed right here in Portland and its surrounding communities. With the talent of OHSU and our other universities

such as Portland State University and Oregon State University, the synergies for practical applications of biosciences research are limitless.

And we have a plan:

The plan involves focussed development in what we have identified as the Science and Technology Quarter in the city. Included in this area is OHSU's main campus, where it employs 10,000 people. Efforts are moving quickly to significantly expand OHSU's facilities on Marquam Hill.

Also included is the Portland State University campus, where expanded facilities for its Engineering school are critically important.

Sites exist for biomedical commercialization in several areas on the east side of the Willamette, where economic development is critical and a workforce stands ready.

The crown jewel of our plan, is the area we call North Macadam. This 130-acre site has the potential to one day be the place where businesses come and grow to take advantage of the intellectual resources of OHSU, PSU, OSU and others involved in the biosciences. It is an ideal location, both because of its proximity to the existing and growing OHSU campus, and also because of its proximity to downtown Portland and to major transportation arteries throughout the region.

But such a visionary plan takes enormous focus and commitment, commitment of time and money. It is only going to happen if we all pull together: at the federal, state and city levels. We are talking about building a biosciences community, not just a technology park.

- OHSU and our other research institutions need federal dollars to aid both basic research and the resources necessary to achieve technology transfer to the private sector.
- We need resources for infrastructure required by such highly advanced industrial development: not just streets, sidewalks, water and sewers, but the best in high-speed communication links.
- We need transportation resources to continue the national leadership provided by Portland in development of clean rapid transit. Because of its geographic realities, without efficient public transit, the North Macadam area cannot succeed.
- And we need funds for protecting the environment of this beautifully situated location which has suffered from less well-informed development in the past.

Don Mazziotti, Executive Director of the Portland Development Commission will speak in greater detail about the specific needs of developing North Macadam, and of the partnerships the city is developing with the private sector to help make our vision a reality.

Making biosciences a key part of Portland's economic future is critical to the continued vitality and livability of Portland. All of the City's institutions, private and public stand ready to work together to make this a reality, but Portland and Oregon need your help.

Thank you.

Senator WYDEN. Thank you, Mayor. We will have some questions in a minute.

Mr. Kelley?

STATEMENT OF GIL KELLEY, DIRECTOR, BUREAU OF PLANNING, PORTLAND, OR

Mr. KELLEY. Thank you. Good morning, Senator Wyden. You have alluded already to the importance of many of the important social benefits of bioscience. I have been asked to describe whether a bioscience industry might take root in Portland, and why, and what we are doing about it, and how the federal government might help.

I must say at the outset that I am optimistic about the potential for bioscience industry developing in Portland and it becoming an integral part of the region's economy over the next 30 years. I also believe that that industry can take root in Portland's central city and that the window of opportunity to seize that potential is now.

We Portlanders take great pride in the city we've built. Many of the features that distinguish our city from others result from thoughtful planning and implementation efforts that are effective. Our successes are attributable to taking the long view on difficult issues, looking for the best opportunities and then assembling the tools and partnerships necessary to bring about dramatic changes. This attitude was the hallmark of Portland's success 30 years ago in stemming the tide of suburbanization and sprawl, in reinvesting and revitalizing the core of our city as an economically viable and highly livable place.

When she hired me two years ago, Mayor Katz asked that I encourage the City of Portland once again to think boldly about future development in the city. And we believe that we can build on our past efforts in Portland and actually take them to the next level by exploring the potential synergies between a healthy environment, a vital and participatory economy, a compelling urban form and rich cultural attributes. I believe that bioscience and related knowledge-based industries can serve these goals well and build upon the strengths and investments that are already here in Portland in the Portland region. In fact, the city is currently actively engaged in the pre-planning efforts that have been known to draw on this potential, and these are located within Portland's central city. These include a framework plan for a science and technology corridor adjacent to the south part of downtown as reflected on the drawing to my left. The Marquam Hill Plan, which encompasses the site where OHSU now resides, and the South Waterfront/North Macadam Plan, which comprises largely vacant land and the previously industrial site adjacent to the river.

Before getting into the detail of those, let me set the context for bioscience in Portland. Oregon and Portland, including the southern Washington area, Portland Metro region, have been transitioning away from a natural resource-dependent economy over the last 30 years. The first major step in this, of course, was the development of an information-based technology in Tualatin Valley. Although this industry largely began with scientific equipment, then with a computer chip manufacturer, it has not only blossomed and has expanded, but it has spawned a research sector there that will sustain that information technology as that industry grows and changes over time.

I believe that in the case of bioscience, this will occur in reverse order. That is to say, while the science and technology with regard to information technology grew out of corporate research, in the case of bioscience, I believe it will grow out of the research conducted at Oregon Health Sciences University, and in fact, the merger of these two technologies, information and biomedicine, will give Portland a relative advantage over other parts of the country.

Finally, Portland State's aggressive efforts to promote and develop engineering expertise in health technology and biomechanics furthers the ability for the Portland region to develop applications in biosciences.

While the bioscience industry at the moment in Portland and in Oregon is very modest in size, I believe that it can grow dramatically over the next two or three decades. I believe this can be

achieved if OHSU continues its current dramatic trajectory of attracting research grants.

You will hear later from Dr. Kohler about that trajectory. But it is indeed dramatic. Their aspirations of reaching the top 20 standards for NIH funding seems to be easily within grasp. Their strength for Portland relies on initiatives that they have already developed and that continue to attract top flight talent.

Rather than proceed with our planning efforts simply on a hunch, we commissioned a study by the Battelle Memorial Institute of Technology Partnership Practice, and that study is appended to my testimony in the record.

Let me just say briefly that that study found that while Portland is already a leader in the digital revolution of electronics, computers, communications and informatics, Portland and Oregon possess the potential to become leaders in important niches of the bio revolution.

Their findings relate primarily to the existence of that research function at Oregon Health Sciences University, as well as the merger with Oregon Graduate Institute, and those other technologies. They have also found the livability of Portland is indeed a factor as well.

I'm running out of time here. Let me just conclude by saying that we are actively engaged in the efforts to ensure that the southern end of the downtown and what we're calling the Science and Technology Corridor develops to capacity over the next 30 years to hold as many as 20,000 to 30,000 jobs potentially filled with this industry and its related work. In North Macadam and on Marquam Hill, we are actively engaged in planning. Those plans are now before the Planning Commission and will soon go to the City Council for approval.

The areas in which the city needs particular help from our federal partners involve some the Mayor has already mentioned, and Don Mazziotti will talk about in more detail, but those involve the transportation infrastructure within that order, particularly connections to rapid transit—rapid transit systems within the district, as well as connections to the regional system that is right at the doorstep; brownfields redevelopment, including innovative bank treatments along the Willamette River and rehabilitation of industrial sites; basic utilities, particularly within the south waterfront North Macadam district; creation of incubator space for research in emerging technologies; and assistance with capital facilities and institutions located or expanding within the corridor.

I would just say that this corridor possesses a unique opportunity to accommodate an industry because it has already six academic institutions present in the district. Those all intend to stay and expand. We know of at least two others who are interested in joining in this area of the central city. It can become the incubator for spawning many private applications which we hope will also take root in the center part of the Portland area. Thank you.

[The prepared statement of Mr. Kelley follows:]

PREPARED STATEMENT OF GIL KELLEY, DIRECTOR, BUREAU OF PLANNING, PORTLAND, OR

Thank you for providing me this opportunity to share with you some thoughts about the potential for development of a bioscience industry in Portland. I am optimistic that this and related knowledge-based industries will become an integral part of the region's economy over the next 30 years. I also believe the bioscience industry can take root in Portland's central city, and that the critical window of opportunity to seize this potential is now.

We Portlanders take great pride in the city we've built. Many of the features that distinguish our city from others result from thoughtful planning and effective implementation. Our successes are attributable to taking the long view on difficult issues, looking for the best opportunities, and then assembling the tools and partnerships to bring about dramatic changes. This attitude was the hallmark of Portland's success 30 years ago in reversing the trend of suburbanization and revitalizing the core of our city as an economically viable and highly "livable" place.

When she hired me two years ago, Mayor Vera Katz asked that I encourage the City of Portland to once again think boldly in terms of our future development. The Mayor and I believe that we should not only build upon successful past efforts but reach new levels of success. This should be done by maximizing the potential synergies between a healthy environment, a vital and participatory economy, a compelling urban form, and rich cultural attributes. Since my hire, I have believed that growing the bioscience and related knowledge-based industries serve these goals well and build upon strengths and investments already present in Portland and the region.

In fact, the City is actively engaged in three planning efforts that draw upon the potential for these industries to grow in the central city. These include a framework plan for a Science and Technology Quarter adjacent to and overlapping south downtown Portland and two specific subdistrict plans within this quarter. The Marquam Hill Plan encompasses OHSU's present campus. The South Waterfront/North Macadam Plan comprises a large, mostly vacant tract of land on the Willamette River where an OHSU campus expansion is being planned along with space for other public and private research activities, hotels, housing and parks. Before discussing these efforts in more detail, I would like to set the context with regard to the potential for bioscience development in Portland.

Oregon and the Portland area, including southern Washington, have been transitioning away from a natural resource-dependent economy over the past 30 years. The first major step in this evolution was the creation of an information technology-based industry, centered in the Tualatin Valley. Initially created by producing scientific equipment and later by manufacturing computer chips, this industry has blossomed and diversified into many areas of information technology. Perhaps more importantly, it has spawned an important research sector that will enable us to sustain our information-based industries into the future as this area of the economy continues to evolve over time. Although this research function has primarily existed in corporate venues, it has in recent years led to the creation of a more public research entity, the Oregon Graduate Institute (OGI), whose activity will serve the entirety of the local industry and beyond.

In the case of growing a bioscience industry here, I believe this process will operate in reverse: it will stem from research already underway at Oregon Health &

Science University (OHSU), and with the right set of actions will spin off private applications, many of which can be developed locally. The recent merger of OGI with OHSU signals an institutional and corporate awareness of an important emerging industry trend—a "mega-trend" if you will—the convergence of information and bioscience technologies. This trend may put Portland at a relative advantage over some other areas of the country if both kinds of research activities can reach a critical mass here. In addition, Portland State University's engineering program with a focus on nanotechnology and biomechanics will also contribute to Portland's potential to be at the center of revolutionary discoveries and new applications in biotechnology.

While the Portland area's present bioscience industry is very modest in size, about 2,300 employees in the year 2000, its potential growth in the next decade or two may be very high. I believe this can be achieved if OHSU continues its dramatic trajectory in attracting critical research grants ($41 million in 1989 to over $200 million in 2002), and reaches its goal of being one of the top 20 NIH funding status within the next few years (from 87th in 1986 to 29th in 2000). OHSU already has developed highly respected research niches and continues to build upon its strengths in pediatrics, heart, cancer, neurosciences, diabetes, bioinformatics/health informatics, proteomics, genomics, and biomedical engineering.

To test the validity of our hunch, the Planning Bureau recently commissioned a study by Battelle Memorial Institute's Technology Partnership Practice entitled "Building Bioscience in Portland: An Assessment of Oregon Health & Science University's Research Prospects and Portland's Bioscience Economic Potential," February 2002. Battelle, a non-profit research group, is the nation's leading consultant on building effective higher education-business partnerships for technology-based economic development. The purpose of this study was to assess the potential for establishing a substantial bioscience industry in Portland and to examine the relationship of OHSU's current and planned activities to that potential. Their report is appended to this testimony, along with two other reports that examined questions about land availability and transportation needs.

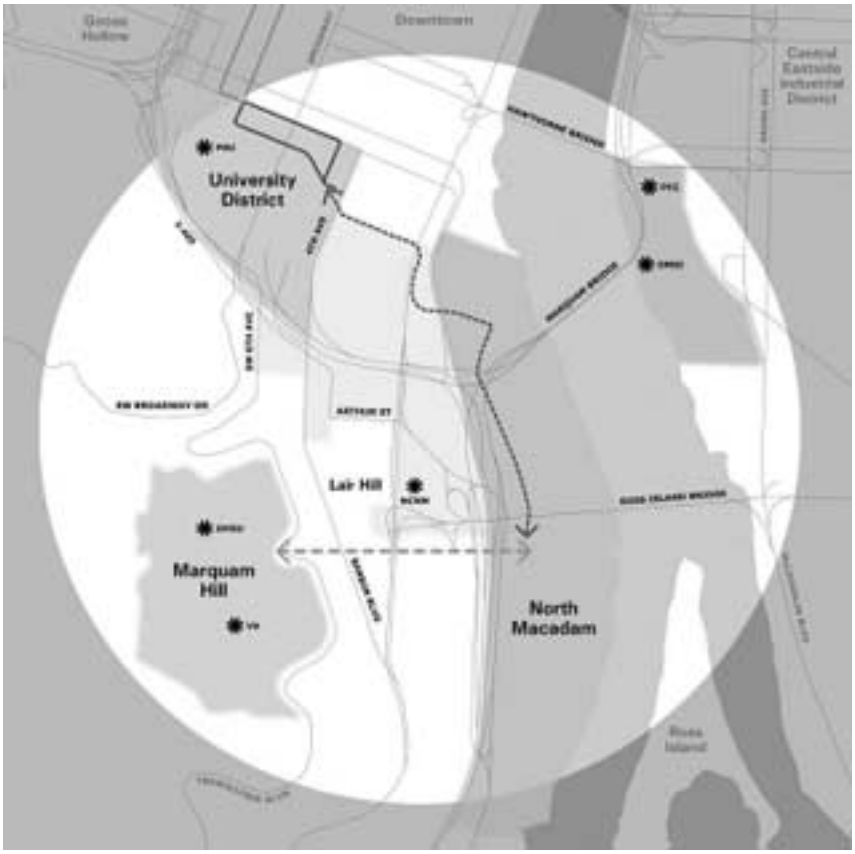
The Battelle Report offers a key finding regarding the economic potential for continued scientific innovation in the Portland area: "Already a leader in the digital revolution of electronics, computers, communications, and informatics, Portland and Oregon possess the potential to become leaders in important 'niches' of the 'bio revolution' as well." Additional findings include:

- Of the factors needed for developing a successful bioscience center, having a critical mass of research is most important.
- OHSU's research function is approaching critical mass and its goal of achieving top 20 NIH funding status is achievable if OHSU can move forward quickly with adding research and support facilities.
- OHSU has a realistic and comprehensive understanding of how to achieve this goal by building upon its core multi-disciplinary strengths and by recruiting "star" faculty in emerging areas.
- OHSU's ability to attract further research grants is constrained by their currently limited laboratory space.
- The OHSU/OGI merger and the $500 million combined Oregon Opportunity Fund bolsters the ability to both accelerate and expand research and development opportunities.
- The quality of life in Portland is an important asset in attracting top research talent.
- Bioscience research and many forms of production can locate in a central city location where good transit and other urban amenities exist, even if that means going into mid-rise (5–15 story) buildings, particularly where they are proximate to clinical and teaching facilities.

The Battelle study also concluded that Portland needs to move quickly to fill critical gaps:

- Plans and infrastructure to make expansion lands available.
- Wet lab incubator and multi-tenant space.
- Rapid, reliable transportation between Marquam Hill and other parts of the Science and Technology Quarter as well as links to the regional transportation network.

- Stronger networks between researchers, service providers, industries and other groups.
- Increased access to capital at all stages of program development.
- Sustained commitment to education funding.



I believe the first three gaps can be addressed and Portland's advantages captured through the development of a Science and Technology Quarter at the southern edge of the central city, based on some key factors:

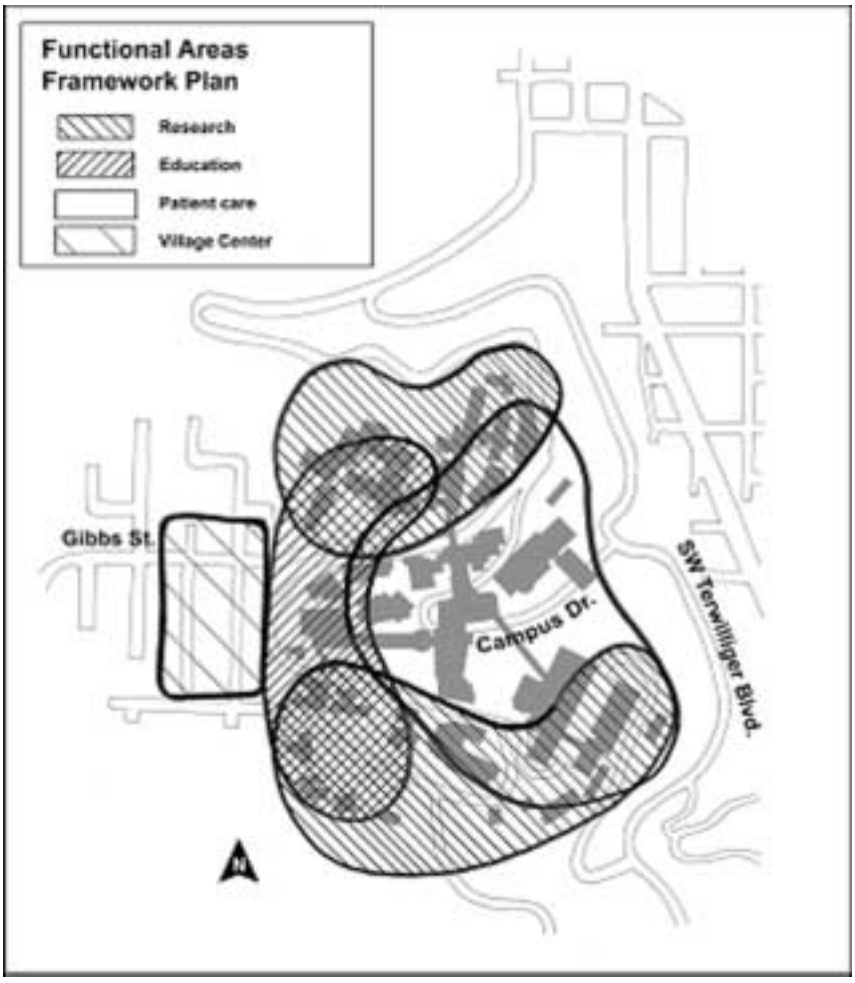
- OHSU is reaching the developable limits of its Marquam Hill campus, and strongly prefers expansion nearby rather than in a more distant part of the region.
- Portland State University (PSU), the university with the highest enrollment in the state, forms a significant anchor to the Quarter. PSU's vision is of an urban university not dissimilar from the University of Washington in Seattle or the University of California in Berkeley. The University District Plan sets forth an ambitious agenda for PSU improvements, including a new building for the School of Engineering.
- Oregon State University and OGI have expressed some level of interest in creating a presence within the Quarter. Several specialized medical schools affiliated with OHSU, including the School of Pharmacy and School of Dentistry, have also expressed interest in expanding and have the potential to develop applied technologies.

- Portland has committed itself to increasing jobs in the central city. A very preliminary analysis of Science and Technology Quarter jobs production indicates the capacity to accommodate between 20,000 and 30,000 new jobs.
- Much of the land at the southern edge of the central city is ripe for redevelopment. An analysis of property values shows that as many as 170 net acres could be redeveloped over the next three decades.
- Creation of new jobs in the central city makes use of the substantial investment in the existing regional transportation system.
- The Quarter's proximity to the heart of the central city has the potential to build upon Portland's biggest success: a very livable and exciting 24-hour, mixed-use urban district.
- Bioscience can be accommodated in a vertical format (taller buildings) rather than a land-intensive industrial park format.

Our approach has been to sketch out this framework of the Science and Technology Quarter and to focus initial planning efforts in the two subdistricts where activity would begin and where detailed land use policy, infrastructure financing, land assembly and environmental improvements are critical. These are Marquam Hill and South Waterfront (North Macadam).

Marquam Hill is located just south of downtown Portland, approximately one-half mile west of the Willamette River. The area has very limited road access, but is home to over 4 million square feet of institutional development, including OHSU, the Veterans Affairs Medical Center, and Shriners Hospital for Children. Surrounding this intensive urban scale development are hundreds of acres of environmentally sensitive open space; some is publicly owned park land and some is privately owned undeveloped land. Nestled between these two extremes are pockets of single family housing.

The proposed Marquam Hill Plan presents new policies and regulations to allow but limit institutional expansion, protect valuable open space and natural resources, and enhance neighborhood livability. A controversial but key provision in the plan proposes to allow the development of a suspended cable transportation system (aerial tram or gondola) linking Marquam Hill with a proposed OHSU expansion site in the North Macadam district.



The proposed Marquam Hill Plan is currently being reviewed by the Planning Commission and their recommendation is expected to be before City Council early this summer.

The South Waterfront (North Macadam) district is a 130-acre, previously industrial area on the west bank of the Willamette River just south of downtown. Current plans would accommodate at least 10,000 jobs and 5,000 housing units. Buildings could be as tall as 20 stories and the district would include a reclaimed riverbank with a broad, undulating "greenway" as its front yard. Policies call for interior parks and plazas, extension of the Central City Streetcar into the district, connections to other locations by regional transit, creation of hotels, restaurants and conference facilities, and innovative, environmentally sound building practices.

The detailed plan for the district will be before the City's Planning Commission for hearings next month and is expected to be before the City Council by fall. A group of private investors, North Macadam Investors Inc. (NMI), are making plans with OHSU to create an OHSU campus, several hundred housing units and a hotel-conference facility in the center of the district within the next 3 years.

The City of Portland and private parties face immediate challenges in bringing these plans to fruition. Infrastructure costs are very substantial, even for the initial NMI/OHSU development and cannot be borne by local sources alone. I believe federal partners will be needed to assist with urgent capital needs, including:

- Transportation infrastructure—particularly for rapid transit systems within the Quarter and links to the regional system and Marquam Hill.
- Brownfield redevelopment and innovative riverbank/greenway treatments, particularly in the South Waterfront (North Macadam) district.
- Basic utilities, particularly in the South Waterfront (North Macadam) district.
- Creation of incubator space for research in emerging technologies.

- Assistance with capital facilities for institutions locating or expanding within the Quarter.

Don Mazziotti, the Executive Director of the Portland Development Commission, will provide detailed testimony regarding these needs.

In summary, I believe the development of a biotechnology hub in Portland's central city is an enticing and very real opportunity. The transformative economic development potential, when coupled with the opportunity to induce dramatic urban redevelopment, represents the kind of threshold opportunity that comes along perhaps only once each generation. Fully realizing the potential will be a collaborative effort that includes local, regional, state, and federal commitments to hard work, good plans, and excellent implementation. I am sure it can be done.

Thank you again for the opportunity to share these thoughts.

Attachments: *

Building Bioscience in Portland (the "Battelle Report")
http://www.planning.ci.portland.or.us/pdf/mh__biosc__ptld020802.pdf
Marquam Hill Plan Alternative Location Analysis
http://www.planning.ci.portland.or.us/pdf/mh__alt__location020802.pdf
Transportation Peer Review Panel Report
http://www.planning.ci.portland.or.us/pdf/mh__trans__peer010402.pdf

Voice: Again, Senator Wyden, as a citizen of the United States, I would like to offer a diversity of opinions, sir. Are we engaged in a Dick Cheney energy task force where we only listen to the business people? Where is the dialog? Where is the diversity of opinion?

Voice: Right on.

Voice: I'm leaving because this is just a charade. It's all about the people who agree. Where is the debate? Dick Cheney is doing the same thing with the energy policy.

Senator WYDEN. Let me just state for the record, I very much respect the right of all persons to petition the government, and I know people have different views on these issues and——

Voice: And they are not represented here.

Senator WYDEN. I would only state again that on my watch, as United States Senator, I have done something nobody has ever

* Attachments have been retained in the Subcommittee files.

done in our state's history, and that is to have open meetings in every county every year. Nobody has any problem at all in our state being heard on issues that are important under public meetings open to all.

Today, however, is a Senate field hearing. We are going to have a Senate field hearing. Ma'am, with all due suspect, again, we welcome your attendance here, but we are going to have to go forward and have this hearing in an orderly way. I am going to direct the staff again to take the steps that will ensure that the hearing——

Voice: To ensure our silence.

Senator WYDEN. Mayor, let us begin talking about the job creation possibilities in terms of Oregon. In fact, I think what I would like to do, perhaps, Mayor, you and Mr. Kelley can decide between yourselves how you want to handle the questions. These involve the plans that you all have worked on jointly. Let's start by talking about the job creation potential for Oregon and Portland on these issues.

As both of you know, there is so much economic hurt out there. We are proud to be leading the country in a lot of areas. We don't much like leading the country in unemployment. Consistently, we find ourselves in just that boat. So, I think the first thing we ought to be examining as you all look at your initiative is what kind of job creation potential is there for good family wage employment as part of your plans? I know you have got 18 months in this exercise in terms of making the case for Portland and biotechnology.

Let us start with the thing that I think is first on the minds of the citizens and that is what is the job creation potential here? And Mayor, however you and Mr. Kelley want to do it.

Mr. KELLEY. Yes, I think there are two critical aspects to that. One is the number of new jobs that might be created, and the second is the quality of those jobs and how Oregonians might get access to them, and the second is more difficult.

This is a collective, well-educated hunch that we are asserting, that bioscience will take off from the research that is currently primarily at OHSU and OGI. We believe—excuse me—OHSU now employs 10,000 people in the city and is the city's largest employer. A substantial number of those people are involved in the three disciplines that really feed the potential private sector spinoff from this. And those are research and clinical work and teaching. In many cases, the highest level of research that may be attracted here on grant status will actually engage in all three of those activities. Attracting that grant money brings with it the possibility of additional research staff, which may or may not come from the Portland region.

The real power, I think, is as applications develop from that research. If the right steps are taken with patenting, with raising capital for space in the city, the possibility to locate the applied research and even predevelopment or development activities in Portland is really the prize here, and that is why we have taken great efforts to make land available, to plan the infrastructure, and to struggle to find ways to finance the infrastructure so we have that capacity.

The job spectrum within these institutions is quite broad, and there are entry level and semitechnical and highly technical posi-

tions. So, I think there is a range of salaries and incomes involved. Overall, the average wage in the industry is high and would be a good thing for Oregonians if it can expand.

We expect that on a very conservative basis that the amount of space that OHSU builds for its own reasons might be multiplied two or three times over the 30-year span for private industry. I think that is a very achievable number. If we do the right things and do them soon enough to make the investments, it could go beyond that number. I think there is a substantial private spinoff that may be involved here. It is not only the biomedical but also other related medical schools, the School of Dentistry, the School of Pharmacy, which are, in fact, spinning off new technologies for delivering therapies and so forth. Those are very important in related fields as well.

Mayor KATZ. Let me just add, Senator, that in addition to employment opportunities and the expansion of jobs, this is also an opportunity to build another community within our urban growth boundary. It is over 100 acres where we not only expect the expansion of the research and development and hopefully spin-offs by the private sector, but also a place for people to live and to recreate and to provide opportunities for the communities around Marquam Hill to reach the river, which is, right now they are completely prevented from doing that. So, it has a multifaceted approach.

Today, we are specifically talking about the employment in the future of biosciences, but we are also looking at the whole community and the opportunities there.

Senator WYDEN. Let me push you a little bit, Mr. Kelley. Give me a number, even a conservative number because I think that is what citizens want. I think we all know that due to the good work of the Mayor as well as many others that Portland had a good win this week in terms of the wind firm. This is a chance to build a very exciting trend in Oregon for renewable energy and the like.

Be conservative for a moment but push a little bit so people can walk out of here with a sense—even conservatively—of what might be the number in terms of jobs created.

Mr. KELLEY. Well, I think the lines are blurry between bioscience and biomedical and some of the other information technology.

Let me just answer it this way, and I would also ask you to ask the same question of Don Mazziotti because——

Senator WYDEN. Fair enough.

Mr. KELLEY.—he is also doing a study at the moment of different industry sectors and clusters.

I would say that we are planning on a capacity basis to hold at least 20,000 to 30,000 new jobs in the Science and Technology Corridor. How many of those are directly attributable to bioscience is difficult to say.

The South Waterfront or North Macadam District alone intends to hold 10,000 jobs over the next 20 years, and I think that that number is probably achievable in that timeframe with spin-offs from the various educational institutions that I mentioned.

Senator WYDEN. We will let you off the hook and get Mr. Mazziotti. Mr. Mazziotti is on notice that he gets more questions.

Mayor, I think you made a good point in terms of livability. Please amplify a little bit. When you are making the case for

biotech companies both coming and staying as you try to promote this, what do you think are the two or three things that are our best selling points in terms of making Oregon attractive and viable for biotech?

Mayor KATZ. It's an easy question to answer because it is the same with almost every industry and company looking to expand or coming into this region, and that's the quality of life, because the bottom line is it is their families that are going to move and their children that are going to go to the schools. It's our educational opportunities, from elementary through to university opportunities.

But if I had—if I had to point to the most critical issue, that's a skilled work force. It isn't the taxes. Sure, they want us to put packages together of available tools that we have at the local level and at the State level, but what they want most of all is the availability of a work force that has the skills to meet their needs and to meet their needs quickly. And one of the things that we are able to offer here is we have three community colleges within this region, as well as a university system that is ready and prepared, because I warned them that if we're going to be successful, they are going to have to be ready immediately and prepared to provide those skills and to retrain and train people who are either underemployed or unemployed or people that want to develop new careers.

Senator WYDEN. Why, Mayor, did you all choose biosciences? I mean, in effect, when you are talking about your economic development strategy, you have got a whole host of things that you can look at in areas that strike you as promising and the like. Why Portland and the biosciences?

Mayor KATZ. Well, because we have—we still maintain one of the few cities in this country that has still maintained a strong manufacturing base. We look at clusters of industries. We identified the creative services as a cluster several years ago. That's grown very successfully. But the obvious answer to the question is we have the Health Sciences University up on the hill growing, expanding there and ready to expand somewhere else in this region. And with them, we have our partners at Portland State University. The obvious place for them to expand is close to where their medical research and their medical services are provided, and that's up on the hill. To come down to North Macadam and to provide a transportation system for them that works for them in the community is really critical. That's one of the reasons that we picked biosciences, because we have the foundation here in this community of major research accomplishments, a bright future, a growth opportunity for this city and for the state because it has tentacles that move all the way out to other parts of Oregon.

Senator WYDEN. What, in your view, are the barriers to Portland's tapping its full potential as a biotechnology hub?

Mr. KELLEY. That's a very important question, and we asked the Battelle folks to look at that question. Let me just summarize their six findings in that area. While they said we have many strengths and advantages, they did point to six weaknesses.

First is we lack plans and infrastructure to make expansion lands available. You've heard today that we're actively engaged in

remedying that situation. We need your help in that regard, particularly on the infrastructure side. There is lack of wet lab and incubator space and multi-tenant space in Portland at the moment. Effectively they said that OHSU's ability to attract new grants is only limited by the available space to them, not by their own plan or their own research abilities or abilities to attract that grant money.

The third thing was rapid and reliable transportation between Marquam Hill and the expansion area, particularly for the South Waterfront and North Macadam area and better links to the regional transportation system, directed at the center of the region but not extremely well linked.

The other three are more difficult and take, really, the industry and the state legislature playing a major role: Stronger networks between researcher service providers, industries and other groups relative to other regions who are more mobilized in this area; the networks are not yet in place. Increased access to capital is very critical, and that will need to grow over time. But really, all stages of the program development from predevelopment to feed capital in the various stages of developing therapies and applications, Portland is remote from the major capital markets. And finally, a sustained commitment to education in the state. That has changed somewhat with the Oregon Opportunity Fund, but it needs to exist at all levels of education so that Oregonians do find their way into these good, high paying jobs.

Senator WYDEN. I would like to next get you to respond to critics of biotechnology. We have had folks here already this morning who share those views, who see biotechnology as undesirable from an environmental standpoint. They have concerns in a whole host of areas from genetically altered foods, to animal rights, to pollution, to manufacturing plants. How would you respond to those concerns, and why have you characterized biotechnology as an industry that would be clean for Oregon? That is of enormous importance to the people of our state. We have consistently been first, as you both know, in terms of clean industry that we can be proud of. So, what do you mean when you describe biotech in your plans as being part of that clean tradition that is so important to the people of Portland and the people of Oregon?

Mr. KELLEY. Well, I think philosophically, like any scientific or technological endeavor, there are possibilities for misuse, as well as for accomplishing wonderful social goods. That really depends on the individuals involved, the credibility and the integrity of the institutions involved, and frankly, regulatory oversight. This is a highly regulated sector of the economy. There are safeguards and checks there.

We feel that the particular endeavors of Oregon Health Sciences University are really geared to the kinds of things that you were articulating earlier, that is to say, to curing some of the most difficult and plaguing diseases and medical conditions that exist now in our population. I think that is really their focus, and Dr. Kohler can explain that in more detail.

We're very encouraged by the kinds of research and the activity that goes on here. And I think there is a possibility of developing

Portland niches that are perhaps the most socially responsible in the industry.

Mayor KATZ. Let me respond this way. One of the reporters asked me how are you going to compete with the Bostons and the San Franciscos of the world? And there is no way that we can compete with major medical research centers broadly, but we can find niches, and we do look for centers of excellence, and those are the ones that we are very interested in developing. And Dr. Kohler can certainly respond more to those questions.

And Senator, I need to meet with one of the potential candidates for the Superintendent's job in about 10 minutes. So, I'm going to have to excuse myself.

Senator WYDEN. We will let you get out the door. We are going to keep Mr. Kelley for another two or 3 hours.

No—I have a few additional questions, but I am going to let you get out the door. I think it is worth noting, particularly for those of us who are elected officials, we are going to have to be able to show at community meetings and other kinds of sessions that we deliver in making sure that biotechnology is in the tradition of this state, that it is a clean industry, that we can address concerns with respect to environmental questions and public health questions and human rights questions, animal rights questions. And I know you share that view, and Godspeed.

Mayor KATZ. Thank you again for bringing the Subcommittee here.

Senator WYDEN. Mr. Kelley, let us talk a little bit, if we could, about the question of attracting companies versus retaining the companies. We are trying to attract entrepreneurial businesses, biotechnology businesses. We have had some folks leave the state. People have gone to the San Diego area. People who have gone to Pennsylvania. People who startup in California based on discoveries from OHSU.

Once you attract these promising firms, what do you have in mind in terms of making sure we can keep them?

Mr. KELLEY. Well, I think there are a couple of aspects of that that are critical. One is achieving the critical mass here of both the applied research within the institutions, and the Battelle study concluded that OHSU is very close to achieving that critical mass.

The second thing is to achieve a critical mass of industries surrounding and locating in proximity to the institutions. That is why we have taken such great pains to do the work that we are doing now in the South Waterfront–North Macadam area and other parts of the central city to make that available.

Clearly, there has to be a lot of work behind the scenes, if you will, in terms of patent-sharing entrepreneurialism on the part of OHSU and others. I think there is an important bill in the legislature later this year to allow some participation in the private benefits on the part of the educational institutions. A series of things that have to be done to lay the groundwork.

It is then important for Don Mazziotti's agency to work very hard with the—both the institutions and the particular private businesses to give them all the encouragement that they can to stay and expand here.

I will have to say that I think there is a third area, which is not only to retain and to attract, but to grow our own. And I think that's primarily what we're focused on here is out of the research that's developed locally, we want to grow companies locally from that.

Senator WYDEN. In terms of creating a biosciences community, the history of Federal involvement with local technology is sort of strewn with all kinds of examples of empty incubators that graduate few companies, do not become self-supporting and basically get put on that sort of long list of boondoggles and failures that sort of involve the combination of inept government with pork-barreling and the like.

I know you are very concerned about this. Mayor Katz, in her written testimony, referenced making sure that what we are going to do is build a bioscience community, not just the technology part. I would like you to sort of explain the difference, in particular, sort of tell the Subcommittee what you have learned from other communities so that we can make sure that we are going to have an incubator that makes a difference, an incubator that really does allow us to graduate self-supporting companies. We want to make a difference and use these dollars being creative and innovative.

Mr. KELLEY. Very, very important question because I think there are as many as 40 states—maybe more now—that have some kind of biotechnology development strategy. We are not using the method that "if we build it, they shall come." That might be a recipe for success or failure. What we are trying to do is ensure a higher degree of success by looking at the activity that's already here and the pressing needs that the institutions that are here now have for that kind of space. We know that space could be used immediately. And so, our plans to build that in proximity to the other critical teaching and clinical functions is really, I think, our solution to that. So that we will start and build over time as the demand occurs, but we think that demand is actually going to be highly accelerated over the next few years in Portland. We are going to have trouble keeping pace with it. Even with federal partners, we don't think we will have those kinds of resources to achieve that kind of model, and nor should we.

The other thing that Mayor Katz alluded to, which is very important, is that we are not building a sort of sterile campus here. We are really envisioning the Science and Technology Corridor as a very mixed use district, as an organic part of central Portland that will include housing, hotels, conference centers, parks, retail, restaurants and a wonderful riverfront. So, in many ways, Portland's diversity of its uses in the center is its best insurance that it survives over time. And I think all we're trying to do is provide capacity within that framework for bioscience and other high technology or knowledge-based industries to flourish.

Senator WYDEN. Walk us through, if you would, those areas where you thought that the federal government could play a useful and constructive role for you. Start with the transportation piece, then go to the brownfields efforts. There probably were a couple of others that were important, but start with the transportation and the environmental pieces.

Give us a sense of what the timetable would be, the cost, and again, how you would address those in line with the commitment that you and the Mayor are making to ensure that this focuses on the clean tradition of industry in Oregon?

Mr. KELLEY. The two areas where we feel the activity will initiate in bioscience and related private technologies are on Marquam Hill and in the South Waterfront, North Macadam district. Those are both highly challenged in terms of the topography on the hill and sort of isolated or landlocked nature at the base because of the current infrastructure.

What that means is that access to both those districts by car is difficult. So, we are forced into a situation to rely on our tradition in Portland of providing a high level of transit and non-single occupant-vehicle means of travel. So, within that framework, I think there are several critical needs. I know Don Mazziotti will speak to these as well. The extension of the Portland streetcar, which connects the downtown directly to the North Macadam District, is of critical importance. That, in turn, connects people to the regional transportation system, both with Tri–Met buses and with Max. So, that connection is absolutely imperative. Over time, we would like to see that extended to Lake Oswego because a lot of the workers coming into this corridor will be coming from south and southwest parts of the region. And an extension of that to the Lake Oswego area is another critical piece.

We look forward to the south extension of the light rail going toward Milwaukie to come either directly into or very close to the North Macadam District, and that is a critically important project, once again drawing a huge population of workers right into the heart of the Science and Technology Corridor as well as to the downtown. Those are the top two.

I would say, in addition to that, there is a possibility of participation in some kind of transportation forum between—directly between the hill and North Macadam. You may be aware of a controversial, but, I think, important proposal to provide some kind of aerial connection system between the hill and North Macadam. I think those are very critical infrastructure improvements on the transportation side.

We need to see the streetcar occurring within the next 3 years, the rapid transportation between the hill and the base of North Macadam in about the same timeframe. The south light rail extensions may take a bit longer, but those are in planning stages now at Tri–Met.

So, I think on the transportation side, those are the most critical. We obviously have other problems to solve in terms of just street infrastructure, which doesn't exist now in the South Waterfront area.

With regard to the riverbank restoration of brownfields, that, again, is an immediate need. A number of properties there are contaminated as was a formerly industrial site. The whole landscape of North Macadam has been manipulated over time and needs to be reworked so that it helps us meet our collective mandates in the city to restore natural health for fish and wildlife.

We have a very ambitious program in the city under the city's River Renaissance Program to restore riverbanks for natural val-

ues and also to get public access there. So, the greenway along North Macadam is really an extension of the Tom McCall Waterfront Park metaphorically, but done in a way that is more environmentally sensitive and would be given the additional challenge of having to deal with those contaminants. That's a future tremendous amenity for this district when we were looking for kind of a defining feature of the North Macadam District, but we will need major investments to pull that one off.

Senator WYDEN. Let me begin by way of describing the challenge. I have to urge you to take out a sharp pencil, as my mother used to say whenever I was asking for various sums of money for various and sundry things that I had in mind. It is going to be tough to get the dollars needed for the transportation, and then environmental remediation work is at the top of my priority list. One of the reasons that I wanted to chair this Subcommittee, in particular, is to promote our opportunities for biotechnology within the kind of clean future that Oregonians want. So, we are going to need those numbers.

Mr. KELLEY. We will be doing that—the Portland Development Commission. We'll be doing that right away.

Senator WYDEN. Unless you have anything further, we will let you go. Thank you very much.

Mr. KELLEY. Thank you.

Senator WYDEN. Next panel, Mr. Bill Grinstein, Associate Director of Public Affairs with Pacific Northwest National Laboratories, and Dr. Denis Burger, Chief Executive Officer of AVI BioPharma.

Gentlemen, we welcome you, Mr. Grinstein, for your good work in Seattle, and Dr. Denis Burger is well recognized as an innovator in the field. Gentlemen, welcome.

We will make your prepared remarks, anything you have, formally a part of the hearing record. If you want to talk a bit, I might have some questions, and make sure that you get a chance to address what is important.

Mr. Grinstein?

STATEMENT OF BILL GRINSTEIN, ASSOCIATE DIRECTOR, PUBLIC AFFAIRS, PACIFIC NORTHWEST NATIONAL LABORATORIES

Mr. GRINSTEIN. Thank you, Senator Wyden. Thanks very much for inviting me to participate.

I'm Bill Grinstein, Associate Director of Public Affairs for Pacific Northwest National Laboratories, which is operated by Battelle, which you've heard about earlier today because of the study on Portland, for the United States Department of Energy.

Our laboratory has major initiatives in biosciences, molecular and systems biology, and we have a lot of strategic relationships and collaborations with major research universities in the Northwest, both in the State of Oregon and the State of Washington. We are also actively involved in the bio-organizations nationally and in Washington: The Biotech Biomedical Association in the State of Washington (WBBA), which I serve on the board of. Also, Dr. Adrian Roberts, my colleague here, has been very involved in the Portland area activities, is very active with the Bioscience and Medical Technology Alliance. So, we are, even as a national laboratory at

the Department of Energy, very involved in health and the biologic sciences in the Northwest.

In addition, we have been involved through Battelle in doing a study for the BIO organization which looked at bioscience and biotechnology activities across the country at the state level. I have been asked today to talk a bit about what is going on across the country. We recognize that there is an enormous amount of opportunity. It varies from state to state, but we thought that might be instructive for you, your staff and for the audience today.

The study that BIO did, which was released in September, I brought along. I actually downloaded it so that the staff could have a copy. And I know how they like to——

Senator WYDEN. All this free time for reading.

Mr. GRINSTEIN. Well, there will be a significant test after this, but it does include an assessment of initiatives and needs of biotech companies and the initiatives states are providing. It was mentioned earlier that 41 states have programs that are described in the study. So we thought that would be of some interest to you.

As I mentioned, this study is available through BIO, and people who want to access it can get it from their web site, which is www.bio.org. The needs have already been described to a certain extent in previous presentations, but let me reiterate. Strong academic research institutions focusing on basic research in biosciences. Access to early stage capital. Successful tech transfer. We talk a lot of tech transfer, but unless the company successfully commercializes that technology and makes a profit, we don't consider it successful. Specialized facilities; we talked about incubators and science parks already. Highly skilled work force and stable supportive policy structure. And, as I mentioned, there are several states that have significant efforts as well as states that have lesser efforts. Let me quickly describe a little of that so we get a flavor of that.

Fourteen states have done bioscience strategies. Some of the significant ones are Arkansas, Hawaii and Michigan—States with very different engagement in bioscience. Interestingly enough, Michigan's strategy resulted in a $50 million a year, 20-year program that appropriated funds from the tobacco settlement creating a life sciences corridor in the State of Washington—excuse me; I need not to be such a geographic chauvinist—in the State of Michigan.

We have seen a lot of increases in state funding for academic research. Let me just cite some examples for this. These are all State appropriations: California, $100 million for the life sciences out of $400 million program to be matched by $200 million of private dollars including three institutions in the U.C. system; Delaware Biotech Institute, $85 million; Illinois, three programs including the Genome Institute, Biomedical Research Institute and the Imaging Center. Three different universities, all part of a $2 billion venture tech initiative for the State of Illinois. In New York, the four Bioscience Star Centers, $15 million each. Georgia, $300 million, which includes endowments for faculty support, research budgets and facilities.

In addition, we have seen several states who are actually directly financing bioscience activities on the venture and investment bank-

ing side. Some have small funds, some have large funds, but California, out of their CALPERS Retirement Fund now has earmarked a portion of that for a venture in the biosciences.

Five states have established funds, including Massachusetts, North Carolina and several other states including Ohio are under development. In facilities, nine states fund directly incubators in science parks, and the concerns that you raised earlier about their success is relevant. What are we getting out of them? Twenty-six states have research parks with some public involvement that have bioscience participation.

We have active trade associations. Of course, the Oregon Bioscience Association is a great example of that. We have them in 35 states, many states having more than one trade association. The existence stresses importance of networking and communication, and hopefully, you are hearing from some of these associations.

Many states are now funding state level commercialization centers to facilitate technology transfer. California, Oklahoma, Maryland and Virginia are great examples of this. We are just beginning to start this in the State of Washington. In the workforce arena 14 states now have A.A. degrees in the biosciences, and that does include Oregon. We are seeing very active partnerships with 4-year schools in many states, and the research institutes outside of the universities, such as the Fred Hutchinson Cancer and Research Center in Seattle and industry—we are seeing very active collaborations in that arena.

Obviously, there are concerns from the biotech community, and the venture side and investment banking side, about the predictability of investment, and a lot of it is related to regulatory issues. So, there are strong interests in genetic privacy laws and the impacts of cloning legislation——

Senator WYDEN. We're just going to have to move on summarizing, Bill.

Mr. GRINSTEIN. I'm actually finished with my formal discussion. Just as I said, to give you a flavor that there is a lot of activity around the country, and it is a very competitive environment.

Senator WYDEN. Well said. We are glad you are here.

Dr. Burger?

STATEMENT OF DENIS BURGER, PH.D., CHAIRMAN AND CHIEF EXECUTIVE OFFICER, AVI BIOPHARMA

Dr. BURGER. Senator, thank you for the opportunity to testify today. I am Denis Burger, and I am the Chairman and CEO of AVI BioPharma. I am really representing today the private biotech sector. After 18 years at OHSU, I have been involved the last 15 years in the private biotech sector, been involved in cofounding a couple of biotech companies. I sit on the board of two publicly traded biotech companies in the San Francisco Bay Area, cofounder of a company that is currently public in Dublin, Ireland which employs about 500 people and is a financial success.

Here in Oregon, I run AVI BioPharma. We are a publicly-traded NASDAQ company. We have a market capitalization of about $250 million. Over the last 10 years, we have raised about $125 million to fund the company. We currently employ about 85 people. We have our own manufacturing facility. We expect our employment to

increase. We have doubled over the last year and a half and will double again over the next year and a half. We currently have six drugs in late stage clinical development, ranging from phase one to phase three clinical trials, and one of the principal reasons that Portland works for us today is the availability of clinical sites in the region from the private hospitals to OHSU where we, at four different institutions, currently have ongoing clinical trials.

The key issue that I am often asked as a representative from the private sector is what is it that is attractive about Portland and Oregon. And when we are out trying to fund our Oregon company nationally, we are always asked, "Can you recruit to Oregon? You are not Seattle. You are not San Francisco. You are not San Diego. How do you recruit? Wouldn't you be better off in one of those other centers?" So, I look at it in a little different perspective because I have to explain this to the financial folks. And we have a proximity here right between a very high cost of living and a high cost of doing business in Seattle and San Francisco. And Oregon has a huge, huge cost of living advantage. The answer to that question is we can recruit from San Francisco, or from San Diego, or from Seattle any time we want for the principal reason that these are high paying jobs. And in San Francisco and Seattle, even those in high paid jobs can't afford housing. Here, our scientists can own their own homes. So, it is a huge advantage here.

And in the last several years, I have been asked again and again in San Francisco, what's the climate like? What if we moved our biotech firm to Oregon? So, I think you are going to see that in the future; firms not only originating here but moving here to take advantage of those costs and considerations. As capital becomes more restricted, more difficult, it becomes more important to manage every dollar. To run our program in San Francisco would cost us approximately twice what it does to do that here.

So, on a positive side for us, there are the clinical centers that are going to reach stages of monoclonal development, the access of public capital which is here, although the private sector may be more difficult. The city infrastructure, all of that is terrific. No complaints whatsoever.

On the negative side, we see always the lack of graduate education. Despite OHSU, despite PSU, Portland doesn't have the big graduate level educational facility. Also, the lack of funds that go to tech transfer I.P. at the university settings. With better funding of those offices, tech transfer could be achieved much better for the private sector.

Senator WYDEN. OK. Gentlemen, thank you. That is very helpful. And let me start with you, if I could, Dr. Burger.

You talked about the advantages, and clearly we have lots to work with. What I want to do is talk about areas where certainly some have suggested we need some shoring up. Let us start by having your assessment of why we lost out on a few of those key examples.

I think you heard me go through several of them. The Northwest Neurologic moved to San Diego. The Bioject moved. The firm went to Laguna Niguel in California. Why do you think, without getting into any of the specifics, why do you think we have lost out in some of those areas?

Dr. BURGER. I think a certain amount of loss is going to be expected, and I think if we were having this discussion in California, you would see just as many firms moving elsewhere. And the San Francisco Bay Area now is concerned about Biotech moving to Redding; if we can't compete with Redding, something is wrong.

So, I think there is a lot of shifts and movement. This is a very small community. We don't yet have here, in Oregon, a big private biotech sector success. We hope we are going to be one of them. But right now, there is not the Amgen, Genentech, or Immunex here yet. A company that is not only providing the core but also is spinning off other small biotech interests. So, I am not so concerned about the couple of examples we have of moving. At early stages, sometimes companies move because they think the capital setting is better elsewhere. I have often heard the criticism that there is not enough venture capital or early stage capital in Oregon, and that may be true. I basically take the feeling that good projects are going to get funded, and capital—there are a few exceptions, certainly. But capital, I don't think, cares that much about where you locate as long as you have accessibility.

Senator WYDEN. That was really my second question, the private capital question because I do hear again and again that private firms question whether there are places they can go to get capital. They have shared their ideas, their views over the years that good ideas find their way where people are interested. That is the way the market supports, the way the free enterprise system works. It does seem that we do have some difficulties in getting access to private capital. What efforts are underway to try to change that?

Dr. BURGER. Well, I think if you look at how to raise capital, we have to go out of state. At the private sector, we raised some capital in-state, but most of our money before we were public came from out of state. So——

Senator WYDEN. As the bio associations network private companies, have you all had some kind of meeting with the various venture firms to discuss what it is going to take?

Dr. BURGER. There is a plethora of meetings with the venture capital firms and organizations from various levels. So, I don't think there is a lack.

Senator WYDEN. No shortage of meetings? I urge you to take that back. That is an area I would like to help with. We do not need any conventions or the like, but we do need to get risk-takers to put dollars into this community rather than looking so often elsewhere. I think more can be done in that area. I would like to help with it.

A question for you, Dr. Grinstein. One of the incentives that the new entrepreneurial businesses adopted was the New Venture Capital Bank. Do you all think that that kind of incentive, a state venture capital bank, can make a meaningful difference?

Mr. GRINSTEIN. Well, we have some issues in the State of Washington related to lending of the full faith credit with the state and constitutional restrictions, which limits some of the opportunities that can be done, but certainly, there is some attention paid to this.

There are banks which characterize themselves as venture banks coming out of other parts of the country, Silicon Valley Bank is one example of this. We know there is a strong interest. This is some-

thing we have explored in the state other than folks who have come into the state.

Senator WYDEN. One other question for you two, some who look at the field, examine the possibilities for biotechnology argue that having a critical mass of biotechnology firms makes everybody more competitive and serves as a magnet for others. Do you share that view, Dr. Burger? And if so, how are we doing in terms of becoming that critical mass, and what can we do to accelerate?

Dr. BURGER. Sure. A critical mass is crucial, and we consider ourselves part of the Pacific Northwest biotech critical mass. So, I don't try to distinguish myself as Oregon biotech, but Pacific Northwest biotech. And with today's technology, I'm as close to companies in Seattle and San Francisco as I am to those in Beaverton or Tigard.

So, I think it's how you position yourself and how well you can communicate. Critical mass for us is OHSU. And the more we have access to OHSU, the better they're funded, the better tech transfer, the better I.P. and those offices are funded, the better it is for us.

Senator WYDEN. What would be your suggestions on tech transfer?

Dr. BURGER. Those offices have to be well funded. If you look at where biotech sprung up: San Francisco, Seattle, San Diego, Boston research triangle and where it didn't: New York, Los Angeles, Chicago. The reason was good tech transfer. And good tech transfer happened because the tech transfer offices were really well funded. They didn't have to extract up front money. They didn't have to ask small companies to pay for I.P. They could back end load it. Therefore, transfer of technology got to the community. And where the tech transfer offices are poorly funded, they have to ask the small startups to pay for the I.P., give them up front funds, and the small companies can't do it, and tech transfer bogs down.

Senator WYDEN. Do you want to add to that?

Mr. GRINSTEIN. Certainly. Dr. Burger suggests where there are strong tech transfer offices and universities, you see the results in terms of licensing royalty income. You also see foundations established at universities which allow them foundations to take equity interest in technologies that innovations that come out of that university.

What we're seeing in very different ways across the states how we fund that, sometimes it's a decision by regents and trustees. Other times it's a direct appropriation from the legislature. And where we've seen some real problems, of course, we are really seeing it now in funding higher education with the budget crisis across the states, that there are certain things that are considered elective, and the tech transfer, in some cases, is considered that way, and the regents are more concerned about faculty retention, as well it should be in some instances. So, it depends on where the decision is made.

I think states can play an active role. We certainly facilitate, through the Department of Energy, technology transfer because as a national laboratory we have a tech transfer office. We work closely with the universities, and we actually fund technical assistance to small companies trying to commercialize the technology; it doesn't do any good sitting in somebody's laboratory.

Senator WYDEN. I could go on some length on this tech transfer issue. Many in the biosciences know I have got strong views on it.

One of the reasons I am really excited about Ballot Measure 10 is it gives us a chance to set up a model that could really work—a homegrown model to connect companies, universities, and research facilities together in a fashion that would make sense. I happen to think that the tech transfer statutes in this country have not served us very well. They have not served the companies well, and have not served the universities well, have not served the taxpayers well. I just think it really is just that explicit.

I share your view that certainly, you have to properly fund the offices that do exist, but we will make that the subject of another hearing focused on making Portland the hub that we have talked about today, a model for the country.

Gentlemen, is there anything else that you would like to add?

Thank you. Our next panel is Dr. Peter Kohler, President of Oregon Health and Science University; Dr. George Pernsteiner, Portland State University; and Mr. Donald Mazziotti, Executive Director, Portland Development Commission.

Dr. KOHLER. Do you have an order of preference here?

Senator WYDEN. No. Why don't we begin with you, Dr. Kohler? You seem ready, and we welcome you. We know the great work you are doing at Oregon Health Sciences University. We speak with great pride to people from all over the country talk about the innovative work and pioneering research that you are doing. You proceed as you like.

STATEMENT OF PETER O. KOHLER, M.D., PRESIDENT, OREGON HEALTH AND SCIENCE UNIVERSITY

Dr. KOHLER. Thank you, Chairman Wyden. I want to thank you for holding these hearings. I think this is a very important topic, and we need to have public attention directed to it because of the potential for the state.

Several of the speakers have actually covered OHSU fairly well. So, I can abbreviate my remarks somewhat, but I do think that one point has been made over and over that is a correct one. To really launch something like biotechnology, perhaps in converse to high tech, you need a very strong scientifically-based university to lead that.

And I would say that we are very close to being there. We are, in my mind, not quite in the very top echelon yet. We are moving upward, and we are very close. One of the things that we look at, for example, is NIH grant awards. We are in the top 30. We are headed, we believe, to the top 20. So, we hope to be a world class institution.

Our current research support is related to some of the other questions you have had. We currently bring in in terms of awards $220 million a year. And you can look at a grant of approximately $100,000 almost like a small business. If you go back to our becoming a public corporation in 1995, since that time, we have added 4,500 people. 4,500 people. A large amount of that was related to the research growth that we have enjoyed. We have expanded tremendously, as you have heard, on the research side.

Each small grant employs generally two to three people. So, you can do some calculations there. If you expand by $150 million, how many additional employees might you expect to have as a result of that? And that does not include those who spin-off as small businesses, which we think is a very important aspect of that as well.

We intend to keep growing our research programs by a rate of about 15 percent per year, which is what we have done historically over the last 7 years or so, which would put us in the $300 million per year range by the year 2005. That would help generate approximately 6,000 additional employees over the next decade. So, a lot of our growth is going to be related to our research.

You have asked about the key ingredients. Our take on it is that capital is very important early on. I will say that we can be blamed also for not funding tech transfer adequately in the early stages. Our first director of tech transfer is in this room. As I recall, we asked her to earn all of her own money. It is the venturing spoon approach that I think universities have tended to take when they are trying to make it on their own.

Management experience is very important. I think that is a key ingredient. The biggest one for us right now is space, space for our research programs, space for the companies that might be spun off to be housed. We need more Denis Burgers in Oregon. I think we need a culture of biotechnology in this state, not just the Northwest, but in the state, centered in the metropolitan Portland area. I think as more companies are created, then become successful, that, in fact, will occur.

The merger with OGI makes us a unique institution. To have graduate engineering and computer science added to the bioscience base is a very powerful combination. In addition, we collaborate extensively with other institutions such as Mr. Pernsteiner's Portland State University. There is a metropolitan collaborative model. We expect that to continue to grow. He will talk more about that later.

The Oregon Opportunity is a very important piece; the funding from the state can be expanded if Measure 11 passes. Using the State tobacco settlement money to expand that to approximately $200 million, rather than 165 million that we would get from a Revenue Bond. So that is important. We are raising gift money to supplement that so that we will have about half a billion dollars with which to work when it is all said and done.

We need new space. The plans for expanding to the riverfront are very exciting. We clearly need to eliminate bottlenecks by building additional research space and adding some capacity, such as imaging, to what we currently do.

We believe there are a few places where new leadership can be recruited in as we build programs, but I think that all of these are coming together in a way that can be very important to the state. If you take a look at where biotechnology is in this country today, it is somewhere in the range of a $50 billion dollar a year industry. That is perhaps old data. It may be larger than that, and I would defer to Don Mazziotti in terms of what it is.

Oregon's percent of the population is about 1 percent. If biotechnology grows to what we predict it will be in about four or five years, it will be in the range of a three-fold expansion. If we capture one percent just based on our population, that should make

the enterprise in Oregon a billion dollar-plus a year industry. We think with the scientific expertise we have, we can do far better than that.

I would like to see biotechnology become a 1 to 3 billion dollar part of the Oregon economy in the next 5 years and increase from there. We believe that discoveries like those of Brian Druker are phenomenal. The commercial value of that will be probably about $500 million a year but will not be realized in Oregon in any important way. We think when the next Druker-like discovery comes along, we want to be able to commercialize it right here and retain that as a very important part of Oregon's economy.

[The prepared statement of Dr. Kohler follows:]

PREPARED STATEMENT OF PETER O. KOHLER, M.D., PRESIDENT, OREGON HEALTH AND SCIENCE UNIVERSITY

Chairman Wyden, thank you for coming to Portland to hold this hearing on a subject of great importance to Oregon's future. For the record, my name is Peter Kohler, and I'm the President of Oregon Health & Science University (OHSU). The question of what factors are needed to make Portland a biotechnology hub has been very much on my mind and those of my colleagues for the past several years, and I appreciate the opportunity to testify here today.

The short answer is that industry development is in some ways analogous to the scientific process itself. Science is an uncertain endeavor, involving experimentation, trial and error. Similarly, there is no single recipe for regional biotech success. On one ingredient, however, experts are unanimous: the presence of a world-class research institution is an absolute must. At OHSU, we are working diligently to become just that: a world-class institution with respect to medical research and biotechnology.

The second primary factor that will determine our state's success in this area is the ability to cultivate a culture of biotechnology. By that, I mean the presence of venture capital funds, management and technology transfer expertise, incubator space, and so on—a biotechnology infrastructure, if you will. I believe this is the bigger challenge for Oregon.

In my remarks today, I would like to start with some of the efforts being made at OHSU to achieve a major leap forward in our research programs. I will then return to the need to develop a culture of biotechnology here in Oregon.

OHSU as a research institution

Let me begin with the importance of OHSU continuing to grow as a research institution. A recent study by the Milken Institute of Santa Monica concluded that "research centers and institutions are undisputedly the most important factor" in incubating high-tech and biotech companies.

The relationship between the thriving Seattle biotech industry and the University of Washington is a case in point. The chart that I've attached to my testimony shows the correlation between research dollars and company development. I think it is particularly interesting to note that the *rate* of company growth has increased over time, as UW's total research grew. In other words, it is important for a research institution to reach a certain size, sometimes referred to as critical mass, at which point returns on investment become even higher. For instance, the UW experience shows that company development really began to take off after 1991, as UW crossed the $300 million threshold in federal research dollars.

At OHSU, we are beginning to approach critical mass. We have increased our research tenfold over the last two decades, to nearly $220 million today. During that time, we have surpassed a number of other academic health centers, moving from #87 in 1986 to #29 in 2001. We expect to surpass $300 million by FY 2005 (based on 15% annual growth in total research grants). We have also improved the quality of our research, as evidenced most notably by Dr. Brian Druker's internationally recognized work targeting the molecular basis of a specific type of leukemia that has implications for the treatment of all cancers.

To further our drive for research excellence, OHSU has in the past year merged with the Oregon Graduate Institute of Science and Technology (OGI). The faculty at the new OGI School of Science and Engineering at OHSU are very strong and enjoy a high level of research funding productivity, comparable to national research leaders on a per faculty basis. The strengths of OGI—computer science, engineering,

environmental science, biochemistry, molecular biology, electrical and computer engineering, and management in science and technology—complement those already in place at OHSU.

OHSU and OGI are well ahead of most academic institutions in recognizing and acting on the growing synergy between medicine, computer science and engineering. We believe the merger will create significant competitive advantages in the commercially important fields of functional genomics, proteomics, and bioinformatics. Oregon is ahead of the trend in this area.

The merger has also allowed us to begin developing a program in biomedical engineering, many of the component parts of which existed prior to the merger and can now be brought together with a concerted effort on program development. As we move forward, we expect to do so in coordination with Portland State University, through their College of Engineering and Computer Science. OGI and PSU have long been partners in expanding engineering education opportunities in the Portland area—for example, they jointly list their class offerings to better serve the high technology community. This is just one area of our overall partnership with PSU—known as the Metropolitan Collaborative Model—that we expect will continue to grow over time. You'll be hearing more about this productive collaboration with PSU from their Vice President for Finance and Administration, George Pernsteiner.

OHSU is poised to achieve critical mass, but the missing ingredient is space. We are above the ninetieth percentile nationally in research awards per square foot. That puts us in a good position to continue our dramatic climb up the NIH rankings, but we must build state-of-the-art laboratory space to enable this future growth.

To address this situation, OHSU developed an initiative called the Oregon Opportunity. The Oregon Opportunity is a $500 million public-private partnership to support major investments in OHSU's research infrastructure and thereby achieve a major leap forward in our research program. It is important to note that we intend to raise the bulk of the Oregon Opportunity investment—$300 million—through a private campaign run by our foundation. I should add that we have already reached the $100 million milestone, well ahead of schedule.

In addition, we asked the state for a $200 million bond. During the past legislative session, the Legislature and the Governor committed to OHSU a fixed revenue stream from the tobacco settlement. This revenue stream will allow OHSU to secure a bond of *up to* $200 million dollars. I should also note that the state referred a measure—Measure 11—to the May 2002 ballot that would authorize the use of general obligation bonds for the Oregon Opportunity. If passed, this measure would mean the full $200 million rather than the $165 million that would result from selling revenue-backed bonds. A committee has been formed to run the campaign, with Senator Hatfield and Governor Kitzhaber as co-chairs.

To fully realize the goals of the Oregon Opportunity, OHSU will build at least 179,000 square feet of new research space as well as purchase and remodel existing space for research laboratories, offices and support space. OHSU will build a new Biomedical Research Building—currently in the planning and design stage—on the Marquam Hill campus, at a cost of approximately $98 million. The new building will provide highly efficient wet bench space and associated lab support and conference areas, expanded facilities for animal research and a core research imaging center. This building is vitally important to help us clear out what might be best described as bottlenecks in our current research infrastructure.

We also plan to recruit leading scientific investigators and their teams—a total of approximately 350 new researchers—to Oregon. In our recruitment efforts, OHSU will prioritize areas of study that mirror and enhance clinical excellence. We will focus our investments in medical research in areas such as advanced imaging, cancer, genomics, bioinformatics, heart disease, neuroscience, women and children's health, hearing research and aging.

The proposed North Macadam development is also integral to the growth of OHSU. We are rapidly running out of space up on Marquam Hill, and to preserve the synergy between research, education and patient care, it's vitally important that we are allowed to grow within Portland's central city area. Connecting North Macadam to Marquam Hill with an aerial tram will help us maintain and enhance that synergy. And of course with OHSU on the waterfront, we believe the North Macadam area will naturally be attractive to biotech companies looking to partner with OHSU and to spin off OHSU discoveries. But you will hear much more about North Macadam from others here today.

Cultivating a Culture of Biotechnology

That brings me to the state of the industry. Today, Oregon's biotech sector is best described as emerging. But we believe it could eventually be the third leg of Or-

egon's economic stool—if we can develop a culture that nurtures and supports new biotech companies.

Presently, Oregon's biotech industry pales compared to those of San Diego, San Francisco or Seattle. But we need not—nor can we afford to—think of biotech as the exclusive province of our larger neighbors to the north and south. San Diego, a community of similar size to Portland, has more than 250 biotech companies. San Diego succeeds where Portland lags because the community as a whole strongly supports the local academic institutions such as Salk, Scripps and UC-San Diego. Here in Oregon, things are moving in a very positive direction. State passage of the Oregon Opportunity bond authority and private philanthropic support in excess of $100 million suggests that our community understands the importance of medical research and biotechnology.

That's the good news. The bad news is that Oregon currently lacks the necessary infrastructure to retain and utilize the intellectual property created at OHSU and elsewhere. We have often been forced to sell or lease the intellectual property before it can develop real value for Oregon. One example of this is the research of Dr. Brian Druker.

Fortunately, there are a number of potential breakthroughs in the OHSU pipeline. Dr. Gail Clinton is in the early stages of developing a breast cancer treatment called herstatin. Based on preliminary results, we think herstatin could generate a billion dollars a year in economic activity. When Dr. Clinton is ready to commercialize her discovery, I want Oregon to be ready to run with the results. This will require elements of a biotech infrastructure not currently in place in Oregon. If we cannot put these elements in place, we will effectively be sending yet another economic windfall to another country like Switzerland, or another state, like California.

To address this situation, OHSU has intensified its search for partners in venture capital, technology transfer, and project management—to enhance our ability to commercialize scientific breakthroughs. The process of commercializing a discovery involves a few discrete steps: select well from among competing discoveries, fund the most promising, and manage the transition from research to production and marketing. As accomplished as OHSU scientists are, they are not trained as managers or entrepreneurs.

Given the large number of recent discoveries on campus and a wealth of existing research in the pipeline, the lack of venture capital and tech transfer capacity could have serious economic consequences for the state. Up until now, discoveries in Oregon usually run out of venture capital funding after the first round. The rights are then sold for a few million dollars and victory is declared. But that's short sighted. Where would Oregon be if Jack Murdock and Howard Vollum had sold Tektronix to investors in California after the first wave of venture capital dried up?

On one of my trips around the state, someone said that selling or licensing our intellectual property is like selling raw logs instead of processing them to add value. In the case of medical research and biotechnology, I would have to say that the economic loss would be far, far greater.

Conclusion

In closing, I'd like to say that it's a real pleasure to testify in a forum that begins with the assumption that Oregon should work to develop a robust biotechnology industry. The question that we debate today is not whether to have an industry, but how to do it. I can assure you that this has not always been the case.

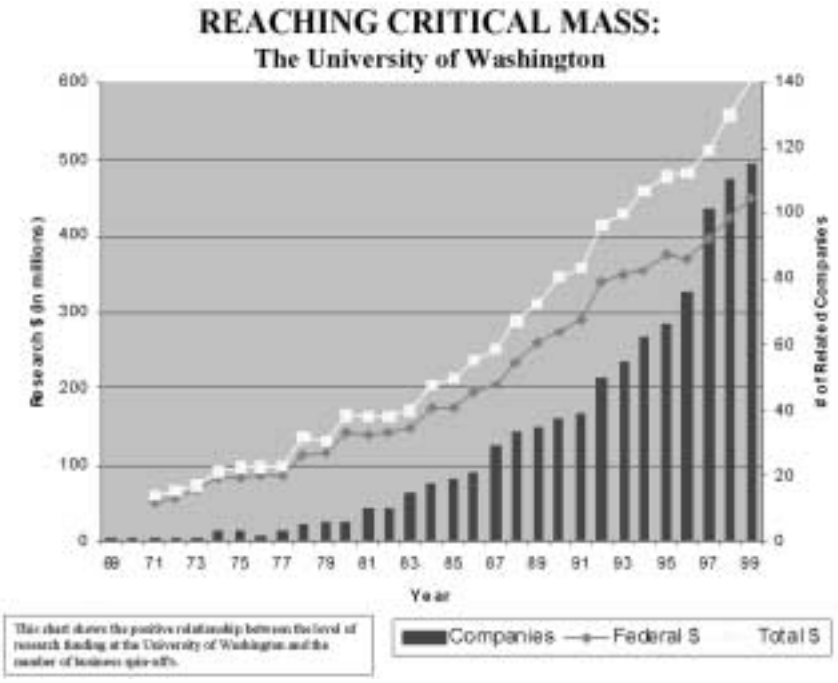
And, at the risk of preaching to the choir, I'd like to share a small piece of our vision for what biotech can mean to the Oregon economy. As reported by Ernst & Young, the biotech industry created more than 437,000 new American jobs in 1999, generating revenues approaching $47 billion. And that's just the tip of the iceberg: genomic results are only now beginning to pour in. Financial analysts project the biotech industry to grow at a 35 percent annual rate for the foreseeable future. Based on conservative economic estimates, we believe Oregon could have a $1 billion annual industry by 2006.

Let me talk a little bit more about that number. If OHSU captures just one percent of new biotech growth between now and 2006, excluding the industry as it stands today, that represents $1 billion. The one percent figure is roughly parallel to Oregon's percentage of the overall U.S. population, so we consider that a fairly conservative estimate. It assumes that the quality of research is the same in every state, which is far from true. OHSU is a growing national leader in medical research. With the high quality of intellectual property coming out of OHSU, we believe that $1 billion figure could eventually be significantly higher. But, as I've said, we still have a ways to go in building a culture of biotechnology.

Once again, I thank you for the opportunity to testify and applaud your willingness to come to Portland to study such an important issue. We think biotechnology

can be part of a very bright economic future for Oregon, and we appreciate your help in making this future a reality.

Thank you.



Senator WYDEN. Very well said, Dr. Kohler. We will have some questions in a moment.

Mr. Pernsteiner, we welcome you. Let me also just make very clear that I think Dr. Bernstine, the President of Portland State, has made a very significant commitment to technology and biosciences. He has spoken to me personally on several occasions. We know the significance Portland State has in this area. We welcome you, and please proceed with your comments.

STATEMENT OF GEORGE PERNSTEINER, VICE PRESIDENT FOR FINANCE AND ADMINISTRATION, PORTLAND STATE UNIVERSITY

Mr. PERNSTEINER. Thank you, Chairman Wyden. I appreciate very much the opportunity to be here. President Bernstine would have been here, but he is at the moment officiating the groundbreaking of our Native American Student and Community Center in downtown Portland. I want to thank you, Senator, and the other Members of Congress for your support for that project and for the Institute of Tribal Governments, which is so intertwined with it. So, thank you very much, and I am sure he will be thinking of you as he turns that shovel.

I am here today to talk a little bit about this from the point of view of Portland State University, which is Oregon's urban univer-

sity. Dr. Kohler mentioned a little bit of the story. Let me add a little of our perspective.

In 1995, Portland State had about 14,000 students. Since that time, we have grown to 22,000 students. We have doubled our funded research in a very short period of time. Part of that is due to this state, and part of that is due to the faculty we have hired and part of it is due to the cooperation and collaboration which we have enjoyed with Oregon Health Sciences University. We have a strong commitment to helping to serve the economic needs of the region. We are focusing, as you have said, in areas of bioscience and biotechnology among some of the others. We view this as a long-term investment. This is not something that's going to happen in a short period of time, and then be gone.

And what I want to talk about a little then is what we are doing that is really long term. The first is to look at what is happening with the enrollment because that really is generating the educated work force which will serve this industry and serve the research that will go on.

I mentioned our enrollment was up some 8½ percent this year over last, which in higher ed is phenomenal, but more importantly than that for the purposes here, engineering, computer science is up almost 21 percent with more than 30 percent at the graduate level. The enrollment in biology is up 16 percent and that of the sciences is up overall 13 percent in 1 year. That follows the year of double digit growth in each of those the prior year.

We are beginning to build the kind of capacity that some of the prior speakers said that we lacked in the Portland metropolitan area. We also view this as long term in that it will take the cooperation of the community colleges and the cooperation of the grade and high schools in this region to make this a sustainable long-term educated work force in this arena.

So, we are working with OHSU in the Saturday Academy. We are focusing our MESA Program on junior high and high school students. We have created new cohorts to train teachers in math, to teach in math and science. And in part, that's funded by NSF grants to those students to be able to study, to be able to learn how to teach in the high schools and middle schools.

We are building our research capacity largely with the funding from private businesses in this area, from the federal government, foundations and from our own resources. They are in various areas that relate to this in biology and chemistry and in things as esoteric, if you will, as life in extreme environments where we try to learn what it is that allows life to sustain itself in thermal vents at 30,000 feet below the ocean's surface and in the Yellowstone geysers.

We are looking at those things because that really is the basic research that some of the prior speakers had talked about that can lead to the improvements in this arena that we all are seeking. We also find the confluence of mechanical engineering, physics, biology and medicine coming together in developing the kinds of both research and products which will lead to the improvements that will sustain this kind of industry and this kind of research. We are doing that in collaboration with mostly OGI and OHSU.

The metropolitan collaborative model which Dr. Kohler mentioned basically combines Oregon's largest university, PSU with its most successful research university, OHSU. We are working together in curriculum, research, planning. They will now do our tech transfer which has been mentioned before, but we are planning not just the programs, but also the facilities, because as with OHSU, we are in dire need of facilities.

And we thank you for your support in the last session for Northwest Center for Science, Engineering and Technology. We look forward to further support in that arena. But we also are looking and planning at what amounts to a research triangle. Portland State University, Oregon State University at Marquam Hill, and North Macadam region where OHSU and PCC and PSU are now trying to plan a future are only about a mile apart, and they are very close geographically. We are trying to link them with the organizations which we will build.

If we were to ask—if you were to ask me what I would like from you, it would be three things. The first is a federal commitment that this is an important long-term investment for the future of America and the future of Oregon.

The second would be a federal participation in the infrastructure and development, both the research facilities for the academy and the transportation links that the Mayor and Gil Kelley talked about that would make that triangle a reality.

And finally, sustained increased support for programatic research in areas, you know, that follow the new NIH model in various agencies of government. We would hope that those would be the kinds of things over a long period of time that would really help us build this industry in Oregon.

Thank you.

[The prepared statement of Mr. Pernsteiner follows:]

PREPARED STATEMENT OF GEORGE PERNSTEINER, VICE PRESIDENT FOR FINANCE AND ADMINISTRATION, PORTLAND STATE UNIVERSITY

Chairman Wyden, thank you for the opportunity to talk with you about bioscience and biotechnology in Oregon and Portland State University's work in this field. I appreciate the opportunity to be here today and your commitment to this vitally important industry. President Bernstine sends his regrets. He is unable to attend this hearing because the campus is engaged in another very exciting activity—we are breaking ground this morning on construction of a Native American Student and Community Center.

Portland State University is Oregon's urban university. We are the state's largest—serving nearly 22,000 students—and most diverse campus. PSU is located in the center of the state's key economic region. Several of our colleges and schools have direct roles in meeting the needs of the region's businesses, particularly those engaged in bioscience and biotechnology. Today I want to focus my comments on three areas: 1) PSU's program efforts in bioscience and biotechnology; 2) An exciting approach to collaboration we have developed with the Oregon Health and Science University; and 3) Recommendations for ways in which our work in bioscience and biotechnology can be enhanced and supported through Federal action.

Portland State University and Bioscience/Biotechnology

Meeting the workforce needs of industry

Portland State University is now the principal education site for knowledge workers in the bioscience and biotechnology industries in Oregon. Enrollment at the campus is growing at unprecedented rates—in the neighborhood of 8 percent a year—and at this rate we estimate a total enrollment of more than 35,000 students in the next ten years. Portland State University also has the largest graduate enrollment in Oregon. Enrollment this year in the College of Engineering and Computer

Science has grown by more than 20.7 percent and enrollment in our science programs is up about 13 percent.

We believe responding to the workforce needs of the high technology and bioscience industries begins with enrollments in these two critical program areas and have worked hard to not only feed the pipeline of students, but also to recruit and retain outstanding math and science oriented students. As part of our commitment to helping high school students prepare for study in this area, we sponsor two important feeder programs: The Math, Engineering, Science Achievement (MESA) program, and Saturday Academy. In addition we have co-admission agreements with the region's community colleges and National Science Foundation funding to help students complete their engineering education—to help students in the last two years of their educational program, to work with Portland Community College to help transfer students in engineering, and to support nontraditional students study engineering. Finally, Portland State University's Graduate School of Education prepares the most teachers in Oregon and is directly focusing on math and science teachers. The faculty in the College of Liberal Arts and Sciences works with students interested in teaching math and science to make sure that they are well prepared in their content areas. In addition, PSU is a partner in two important initiatives: the Oregon Collaborative for Excellence in the Preparation of Teachers (OCEPT) and the Center for Learning and Teaching (CLT). Both of these programs involve collaborating institutions—in Oregon, Montana, and Colorado—and focus on preparing highly effective teachers in math and science and in supporting them in continuing development programs. These initiatives receive substantial funding from the National Science Foundation.

In summary, while higher education is key to the workforce needs of this industry, we believe that true investment in this important economic development priority begins with K–12 education and also involves community colleges.

Supporting industry through research

The bioscience and biotechnology industries require support from highly talented and productive faculty who can work in tandem with companies on new discoveries and innovation. The University is increasing its faculty research base at more than 12 percent a year and we have every expectation that this growth will continue in the future. The administration at Portland State University has made investment in the program areas of engineering, science, technology, and business a priority. Let me highlight some of the progress we have made with regard to bioscience and bioengineering.

- *Bioinformatics and information technology*. PSU faculty have expertise in computer privacy and security issues. This is an important aspect of working in the field of bioinformatics and medical technology because of the sensitive nature of the data. In addition, PSU faculty are also working with OHSU on the use of the high speed Internet2 and its application in research and producing medical quality videoconferencing to support research and health care delivery.
- *Fundamental biological processes*. Faculty at PSU are involved in research related to the regulation of fluid volume and the impact of alcohol on biological processes. Much of the funding for this research is from the National Science Foundation. We also have a faculty member in chemistry doing grant-funded research on chemical detection technology to sense airborne chemicals associated with particular diseases or medical conditions. Additionally, faculty are studying, with NIH support, the neurobiology of hearing and sensory processing to determine how the brain functions, and in particular how the brain assembles sensory information into an accurate picture of the world.
- *Viral infectious diseases*. PSU is building research capacity in this area. The University has a new faculty member in biology who was formerly with the Centers for Disease Control and does research in the area of disease mechanisms and control, particularly the hanta virus. Another new faculty member specializes in viral infections of archae bacteria and the use of virus mechanisms to moderate the genetic composition of the archae. His research on these mechanisms provides some considerable promise in being able to both isolate and identify the expression of genetic characteristics and to modify genetic characteristics to create new organisms with commercially desirable characteristics.
- *Nanoscience and nanotechnology*. PSU faculty members are working on developing a better understanding of the properties of materials. Morphology, crystal structure, chemical composition, interface structure, surfaces and defects all have a strong influence on the properties and behavior of materials. PSU has recently acquired a high resolution Scanning Transmission Electron Microscope

(STEM), an indispensable tool to materials research and related disciplines, including geology, mechanical engineering, chemistry, and life-science areas. The STEM will be used in collaborative projects with local industries, including LSI Logic, Intel, Fujitsu, Novellus, Planar System, Wafertech, SEH America, TriQuint Semiconductor, Industrial Design Corporation, and KLA-Tencor. Users of the new STEM work in a variety of basic and applied scientific disciplines spanning the physical and life sciences, both at PSU and in local research institutions including Oregon Graduate Institute, Oregon Health Science University, Oregon State Public Health Laboratory, Department of Veterans Affairs Medical Research Center, University of Oregon, and University of Washington. There is only one other instrument of this type on the West Coast, and because of its uniqueness, PSU will be a central international training site for users of this technology. The University also plans to make the instrument available to others through the use of Internet2.

- *Life in extreme environments*. Faculty from disciplines such as biology, geology, and chemistry are involved in interdisciplinary research in an important and emerging field: the study of life in nature's most inhospitable places such as the boiling pots of Yellowstone, deep-sea thermal vents, and glaciers. Our faculty members and their work in this area have been featured on CNN, and in Science, Nature, Time magazine, The Christian Science Monitor and The Oregonian. Recently the Keck Foundation affirmed our work in this area by awarding a $750,000 grant to support the development of a field-based research instrument to study microbial communities in their natural environment and to continue building Portland State's genomics capabilities. The field instrument will enable researchers to perform in-depth analysis in real time and under true-life conditions, rather than attempting to simulate these extreme conditions in the laboratory. Keck gives grants to "exemplary institutions where outstanding people are doing bold and important work."
- *Intelligent robotics*. Portland State University's Intelligent Robotics Laboratory, part of the Electrical and Computer Engineering Department, applies machine learning and data analysis algorithms to solving practical problems in the areas of data mining, robotics, and human-machine interaction. This research has obvious implications for the field of biotechnology.
- *Biomedical signal processing*. Portland State University has a programmatic focus in biomedical signal processing. The mission of this program is to advance the art and science of extracting clinically significant information from physiologic signals. The objectives are to develop new methods of signal processing that extract useful information from physiologic signals, to provide students with a solid foundation in statistical data analysis and signal processing, to teach undergraduate and graduate students about the process of knowledge discovery and research, and to serve the needs of the Portland metropolitan area.
- *Materials science*. Faculty are involved in research related to biomedical materials. This research is in partnership with Legacy Hospital, and OHSU's dental and pediatrics programs. They are currently engaged in a discussion about establishing a graduate program in biomedical engineering that would include coursework in biomaterials, biomechanical engineering, and biomedical instrumentation.

The Metropolitan Collaborative Model

The region's economic vitality depends on a strong higher education infrastructure to support workforce development and research. Increasingly, business and civic leaders are saying that a great city like Portland needs to have a great, nationally recognized university. These same leaders have decried the lack of a top research university in the Portland Metropolitan area, citing studies linking the sustained economic development of urban regions and the states they serve with the presence of such institutions. Further, many in the business community have called for Oregon higher education to double the number of graduates in certain high technology and science-affiliated fields.

Portland State University and the Oregon Health and Science University (and its OGI School of Science and Engineering) have responded with a plan called the Metropolitan Collaborative Model (MCM). Working together, PSU and OHSU, along with the region's community colleges and other higher education institutions, have the breadth of programs, quality of faculty, numbers of students, and strength of research activities to not only support the high technology sector, but also the developing bioscience and biotechnology industries. In addition, this collaboration has the elements of a nationally recognized research and teaching comprehensive university.

The goal is to provide the region with research and teaching capacity that competes effectively with the top-tier engineering and science schools in the nation.

The challenge to achieving the educational programs the region's leaders are calling for requires more than a strong commitment by PSU and OHSU to work together. It will require new facilities, new resources, and a willingness by the region's leaders to accept a model of educational services that is different from that traditionally associated with top-tier schools. OHSU is working with the City of Portland on its master plan for development of Marquam Hill and the North Macadam area. That plan must be supported and funding allocated to make those dreams possible. PSU has developed its master plan with the City of Portland called the University District. The next step in the implementation of this plan is construction of the NW Center for Engineering, Science, and Technology. This research complex will serve as a magnet for bioengineering, biotechnology, and other high technology businesses needing close access to high quality faculty and students. Senator Wyden, we are grateful to you and your colleagues in the Oregon delegation for your support of this initiative and hope that Congress will be able to assist us in meeting match requirements for $26.5 million in bonds authorized by the 2001 Oregon Legislature. The master plans of both OHSU and PSU complement each other by forming what some people are calling a science and engineering triangle in the south end of downtown. In accordance, while both OHSU and PSU need additional resources, we believe it is time for us to co-locate some of our mutually compatible and joint research endeavors. That is why PSU has pledged to both the City and OHSU an interest in a collaborative research facility at North Macadam.

Recommendations for Federal Action

In the past, Congress has played a key role in assisting higher education institutions in their development of research facilities. Funding for these types of projects is, as you know, very limited and difficult to secure. In Oregon, we have often been able to secure at least 50 percent of the funding for construction through state bonds. The institutions have been responsible for raising the rest of the funding. Federal funds may be used as part of the match and help institutions such as Portland State University make new construction projects work. We know finding funds for construction is difficult, and we appreciate the work you and others in the delegation do on our behalf, but if construction and facilities programs are not authorized it is very difficult to secure appropriations for these projects.

1. **Recommendation:** Evaluate opportunities within Commerce and other agencies for authorizing support for the development of research facilities and then secure appropriations to make the programs a reality. We would recommend that these programs be targeted, at least initially, to those areas of the country hit the hardest by the recent recession.

Much of the research done at PSU has been possible through grants supported by the Federal government through agencies such as the National Science Foundation, National Institutes of Health, National Aeronautics and Space Administration, Defense, Energy, and others. We are especially appreciative of the significant funding increases for NIH and hope that this year's appropriations process supports growth in research funded by other agencies. As you know, research funding spurs innovation and discoveries, which often lead to commercialization of new products, health cures, and more.

2. **Recommendation:** Support increased funding for research in federal agency budgets, particularly in the areas of science and technology.

In closing, as the region builds its biotechnology and bioscience initiatives, we do face opportunities and challenges. The opportunities are many and I know that the higher education institutions in the region are ready to meet them; the challenges are formidable, but with the help of local, state, and federal partnerships we will be successful.

Thank you again for the opportunity to be a part of this important discussion. Thank you also for your leadership in this area. Portland State University intends to be a full partner in the region's plans for expansion of bioscience and biotechnology business development.

Senator WYDEN. Very good. Mr. Mazziotti, welcome. And you may begin your testimony knowing that you were forewarned a little bit that you would be pushed on the number of jobs and the economic potential. Knowing your good work all these years, I know you are up to that grilling.

STATEMENT OF DONALD F. MAZZIOTTI, EXECUTIVE DIRECTOR, PORTLAND DEVELOPMENT COMMISSION

Mr. MAZZIOTTI. Thank you, Senator. Can you hear me OK? Thank you, Senator.

For the record, my name is Don Mazziotti. I am Executive Director of the Portland Development Commission. I had the opportunity to work with your colleague, Senator Specter, when I was Secretary of Commerce in Pennsylvania, and we developed the Biotechnology Center at Penn State, and then later, the Bioscience Technology Park in West Philadelphia.

I know what these things can do in terms of jobs and research and educational opportunity, as well as building on the resources that that state and our state have.

I really want to—I don't want to repeat the excellent comments made by the Mayor or Gil Kelley, Dr. Kohler, and George Pernsteiner. They said things much better than I can. I guess I would like to summarize on the funding side of this issue and talk about the challenges that we have, try to explain them a little bit to you.

I think we have a tremendous opportunity to create a center for this industry's growth right near in the downtown of Portland in the North Macadam area. I think that North Macadam represents the last significant redevelopment area in the central City of Portland, and one of Oregon's most important economic development opportunities on a state-wide basis.

Despite North Macadam's fantastic waterfront location, the site has remained blighted, vacant and underutilized for many years. This reflects many challenges faced by North Macadam, including environmental contamination, the absence of infrastructure and limited transportation access, which you've heard a bit about today, but the opportunities far outweigh the challenges.

I want to talk about the challenges and how you and the committee might assist us. I think there are three major funding challenges which we would like to ask for your help.

The first is, to launch the OHSU development or any other significant development in the district will require approximately 60 to 73 million dollars of infrastructure in the central district of North Macadam's area. In the written testimony that I have provided to you are not only maps, but also a detailed budget of what those costs add up to and the kind of infrastructure that would be supported by that number.

Second, the funding challenges for environmental cleanup costs, which I recognize, Senator, is one of, if not, your top priorities. The district's former industrial uses have left a legacy of contamination throughout the area. Much of the area is considered brownfield. And although most of the contamination is concentrated in the northern part of North Macadam, there are hotspots of contamination sporadically throughout the district. And it really does require substantial assistance on the federal side to give us what we need to clean up the contamination. Recent passage of federal legislation and appropriations for that purpose could be very helpful.

For many of the property owners, it will be necessary for the public sector to offer assistance on their cleanup through loans and grant programs or to invest public dollars to accomplish that.

The third obstacle is really the other piece of the money challenge overall, which is to find the private dollars necessary to invest in the private organizations and companies that will generate the taxes necessary in the long run to provide the investment capital to get the whole development job done. For that purpose, as you know, we have visited with your staff in Washington and in Portland to discuss the new Market Tax Credit Program, which we believe offers an enormous opportunity for us to focus private sector resources on investment in North Macadam in all of the bioscience-related categories that the Battelle Institute folks have talked about, Dr. Kohler has discussed briefly with you.

It seems likely over time that every major Oregon medical research organization or bioscience-related institution will be located at North Macadam with headquarter or satellite facilities at that location. Given the magnet force that North Macadam appears to represent, based on discussions that we have held with all of those institutions, it seems to me that the critical mass that Gil Kelley mentioned is, in fact, building in the abstract. Now, we have got to make it real by identifying funding sources and strategies which will help North Macadam kick off and be successful, not unlike the effort done 30 years ago when we recruited Bob's Electronics to an old industrial site, or when we took out Harbor Drive and put in a park, or when we took out a parking lot to make way for Pioneer Courthouse Square. These are all redevelopment opportunities that lie before us. I know, Mr. Senator, that you can help us in that regard.

[The prepared statement of Mr. Mazziotti follows:]

PREPARED STATEMENT OF DONALD F. MAZZIOTTI, EXECUTIVE DIRECTOR, PORTLAND DEVELOPMENT COMMISSION

Introduction

Mr. Chairman and members of the Subcommittee, I am Don Mazziotti, Executive Director of the Portland Development Commission, the City of Portland's economic development, housing and redevelopment agency. I would like to express my deep appreciation to you, Senator Wyden, and to members of your Subcommittee for inviting us to address one of the most critical jobs and redevelopment opportunities the City of Portland has seen in nearly three decades.

With the nation's highest unemployment rate, we in Oregon must work to build and further diversify our economy—and we must do it in a manner that maintains and builds upon this region's unparalleled livability. Like the role high technology played in building our strength in the last two decades, biotechnology, health research and biosciences can and should be our focus now and in the decades to come. We have a tremendous opportunity to create a center for this industry's growth right near the heart of downtown Portland—in our North Macadam area. My goal today is to explain that opportunity, its challenges and what is needed to turn this opportunity into reality.

Background

North Macadam represents the last significant redevelopment area in the Central City of Portland. This 130-acre district lies south of downtown, extending about 1.2 miles along the West Bank of the Willamette River to John's Landing. Oregon Health Sciences University (OHSU), one of the City's largest employers, (with more than 10,000 direct employees) as well as established neighborhoods lie to the west. Nearby, Ross Island provides natural habitat and is home to Bald Eagles and many other species. In the next few years, Ross Island Sand and Gravel will donate it to the City for reclamation into extensive habitat.

The North Macadam district consists largely of vacant and underdeveloped land although some light industrial uses still exist. Currently the entire area is privately

owned by twenty-two individual owners including seven riverfront owners. (See the attached ownership map.*)

Despite North Macadam's fabulous waterfront location, the site has remained blighted, vacant, and underutilized industrial land for years. This reflects the many challenges faced by North Macadam, including environmental contamination, absence of infrastructure, and limited transportation access. Beginning in 1997, an extensive public involvement process involving hundreds of citizens addressed transportation, open space, greenway, jobs, housing, and land use needs. This culminated in approval of the North Macadam District Framework Plan and the North Macadam Urban Renewal Plan in August 1999. These plans call for the creation of an exemplary, mixed-use neighborhood that will provide jobs for 10,000 employees and housing for 3,000 residents over the next 20 years contributing to the region's focus on compact growth. The vision for the area is a state-of-the-art biotechnology and science center with OHSU as its founding healthcare and science research entity. (See the attached Framework Plan map.**)

The Opportunity

OHSU presents opportunities to develop biotechnology and bioscience business development in North Macadam with City-wide benefits. OHSU's central campus growth plans combine Marquam Hill and North Macadam. In the plans are 1.2 million square feet in new campus development for administrative, research and development activities in North Macadam. The North Macadam facilities are proposed to be integrated with current facilities on Marquam Hill with an innovative Aerial Transportation linkage, a proven technology, but the first of its kind in an urban area on the West Coast.

North Macadam Investors, LLC (NMI) and Oregon Health Sciences University (OHSU) have agreed to jointly engage in a major redevelopment of over 30 acres translating into 28 blocks of redeveloped property in the heart of the North Macadam district. OHSU, coupled with NMI, is expected to be the genesis of the new North Macadam neighborhood, forming a new commercial, bioscience and residential district. Over the next several years, a "core" concentration of residential and office development (phase I) will be developed followed by additional future development including a hotel/conference center and a bioscience facility.

NMI/OHSU is proposing an innovative approach to developing the riverfront Greenway by re-grading the currently steep bank to a gradual slope for a 100-foot wide Greenway. Construction on this project is expected to begin this year and be completed in 2009.

From 2002–2005 OHSU/NMI intend to complete the following:

300,000 sf for an OHSU Administrative Building and other
150,000 sf for Bioscience Office space
175 units of Market-Rate Condominiums
200 units of Mixed-Income Apartments 30,000 sf
30,000 sf for a Possible Biotechnology Incubator Center
25,000 sf of Retail
East/West streets and pedestrian accessways within the 28 block area
Regrading of the riverbank for a 100-foot wide Greenway
Environmental remediation of contaminated soils

The Funding Challenge

To launch the OHSU/NMI development, or any other significant development in the district a minimum of approximately $60 to $73 million of infrastructure are critical to complete the following key projects for the NMI/OHSU development, beginning immediately:

1. Bond Street construction from Gibbs to Bancroft ($6 million)
2. Bancroft Street improvements ($600,000)
3. Curry Street improvements ($500,000)
4. Harrison Street construction ($3.2 million)
5. Streetcar to Gibbs Street, or RiverPlace at a minimum ($13 to $23 million)
6. Aerial Transportation Linkage to OHSU Campus on Marquam Hill (partial funding—$16 to $20 million)
7. Public Parking Facilities ($4 million)

*The ownership map has been retained in the Subcommittee files.
**The framework plan map has been retained in the Subcommittee files.

8. Greenway Phase I Improvements & Master Plan Work for NMI site ($2 million)
9. Bioscience Incubator ($9 million)
10. River Parkway—Phase I ($.5 million)

TOTAL $59.3 to $73.3 million

Current obstacles limiting public resources for these investments include the recent Oregon Supreme Court decision in *Shilo* v. *Multnomah County et al,* limited early tax increment funds and significant infrastructure cost burdens, and a lack of new development which will generate new tax increment, as well as the state of the local and regional economy. In addition, PDC's tax increment resources in North Macadam are anticipated to be only $50 million over the next 10 years, far less than the infrastructure needs of the district.

The City of Portland has many other important goals for the area that we may not be able to address for several years, including affordable housing, parks, stormwater management and jobs programs. We are actively pursuing alternative funding. Three recent examples of these efforts involve applications to EPA and EDI.

PDC staff has submitted two grant funding requests to the Environmental Protection Agency and is awaiting a decision. The first request of $200,000 was made through the Supplemental Assistance program for level II assessments and development of planning-level concepts for remediation. We are very appreciative of the assistance the Oregon delegation has provided with these efforts. The second request of $65,000 was made for discretionary funds for restoration of a portion of the riverbank in the Greenway with native plantings that will provide habitat for wildlife and aquatic species.

PDC staff has sought up to $2 million in federal assistance in the past and were successful in acquiring $50,000 for Greenway pre-development activities from the U.S. Department of Housing and Urban Development Economic Development Initiative account. These funds will be used to develop a Planting Plan to restore habitat along a portion of the riverbank as well as development of a greenway design concept for a recreation trail intended for local and regional use.

Environmental Obstacles

The district's former industrial uses have left a legacy of contamination throughout the area. Much of the area is considered brownfields and although most contamination is concentrated in the north of the district, hot spots of contamination occur sporadically throughout the district. Of the two heavily contaminated properties in the north, one is development ready and the other is participating in the DEQ voluntary clean-up program. The property owner currently participating in the DEQ program is addressing 35 years of Navy ship building and dismantling and the hazardous substances that came along with this task. *To date, the property owner has spent roughly $1.5 million to determine the extent of the pollution and clean-up costs could be as high as $20 million,* although no hard numbers will be available until the investigation is deemed complete. The threat of environmental contamination has made developers wary of investment in the district.

Site contamination issues are not easily resolved since clean-up is the responsibility of private property owners who must bear the financial burdens of remediation before moving forward with redevelopment. *For many property owners, it will be necessary for the city to offer public assistance with clean-up through loans and/or grant programs or to invest public funds in infrastructure to reduce the overall costs of development and ultimately spur private development.*

Summary

Like the City's vision for downtown Portland, the North Macadam District's vision comprises important ideas that create a vital biosciences center for Portland right in the heart of a lively, urban neighborhood with a diverse population, integrated jobs and housing, accessible and well-crafted open spaces, active streets, pedestrian scale, convenient transit and quality urban design.

Federal assistance is necessary and makes good financial sense in terms of public and environmental benefit.

The North Macadam biosciences center vision embraces the Willamette River and redefines how a dense, vibrant urban environment can peacefully coexist with natural habitat in a riverside setting. The vision includes the genesis of a world renowned health and biosciences research facility coupled with new housing, retail, a restored riverbank, increased habitat for wildlife and aquatic species including the

threatened salmon and steelhead species, and a pedestrian/bicycle trail that will provide the missing link in a 140-mile recreational trail system through the city.

In short, there is tremendous opportunity to create something with a significance unsurpassed by anything this City has done for the past 30 years. Like taking out Harbor Drive and putting in a park, or taking out a parking lot to make way for Pioneer Courthouse Square, the vision of the North Macadam District has the potential to put Portland on the map for innovative thinking, biosciences job creation, and environmental reclamation.

We are currently working to bring the New Markets Tax Credit Program benefits to Portland and are looking at several other government-sponsored programs. We sincerely urge you to work with us in identifying and securing federal funds to help us achieve the vision for biosciences in Portland.

Thank you.

Senator WYDEN. Well said. Excellent panel, and a good one to wrap up with. Let us begin with you, if we could, Dr. Kohler.

The first panel, I think, put a special focus on Portland finding a niche or maybe a couple of niches in the biosciences field.

In your view, what are the most promising niches that Oregon Health Sciences University and Portland should go after? This is a chance for you to sort of frame your kind of vision. I thought it was interesting, I think it was Mr. Burger talking about some of the differences between Seattle and San Francisco. Obviously with that economic development, Mazziotti is ready to grow on the number of jobs and the like. Finding that niche is going to be key.

Take a minute and give us a sense of what you think the best niches are for Portland and Oregon in the biosciences field.

Dr. KOHLER. I really think there are two major categorical niches that I can describe. Of course, any time I mention one thing, I'm leaving out some of the others where we have strength as well, but maybe not of the same magnitude.

The first is in the area of cancer, oncology. I think we have great strength in a number of places there addressing cancer-related issues. We have opportunities, not only at the basic molecular level, but then to apply these to clinical research, to do the testing that needs to be done as well.

Second is the broad area of the neurosciences. One of the problems with neuroscience is it is so broad, but we have very great strength in areas of Alzheimer's disease, Multiple Sclerosis, Parkinsonism and so forth, areas where we are tantalizingly close to treatments for the future.

At our own institution, we have tremendous strength in neuroscience, but it is not coalesced. Our sister institutions in Portland and around the State also have strength in neuroscience. So, I think that is another one where great strides can be made.

Finally, the area of molecular medicine. You take some of our research programs and the complementary ones that exist at the other institutions, in molecular medicine at the genetic level. We can use the information we have from the clinical activity that we do, and it gives us a chance to address a number of diseases and conditions at the molecular level. That sort of research crosses over many boundaries from one discipline to another.

Those, to me, are our best possibilities for future growth. I will agree we can't do everything. We are not going to try to do everything. But those are areas in which we either already have or can easily achieve excellence.

Senator WYDEN. I am really pleased to see you single those out. It is along the lines of what I was talking about earlier in terms of what I saw back in the days of the Gray Panthers which made a difference with people.

You mentioned cancer. Just this morning, someone talked to me about the benefits. The last time I had a gavel in my hand, I was in the House. I chaired the Small Business Subcommittee. It was probably the most important thing we did there was made sure the Taxol got on the market. When our Subcommittee began, the federal government was basically treating the source of taxol as a trash tree. They were burning it up and wasting it and basically acting as if they did not understand what they had on their hands.

We basically, through the congressional Subcommittee, drained the swamp and got the federal agencies, Bureau of Land Management, the Forest Service to treat it as an extraordinary treasure. It was the initial source for taxol. Just this morning somebody talked to me about the benefits the taxol offers for her in the areas you have singled out: cancer, molecular science. I think these are tremendously important and make a lot of sense to me.

Pick up on that and talk to me, maybe playing off a question of what the promising niches are, what are the areas you would really like to see funding from the federal agencies in the next few years and clearly with NIH work, NCI work. You work with a variety of federal funders. What are the really key areas that you hope to tap for federally funded research?

Dr. KOHLER. First of all, let me say, I appreciate your support for the NIH budget. I mean, this is the best time; we are going to look back and say, "These were the best days for biomedical research ever."

Senator WYDEN. We finally got a nominee to head NIH. The longest running ballot since the Trojan War.

Dr. KOHLER. Congratulations, and he is not confirmed yet. That's pretty good. The NIH budget overall is very important.

One of the areas that has lacked, I think, funding at the NIH level is the infrastructure. What is happening at our place is a perfect example. We have brilliant scientists. We have lots of opportunities. We are very competitive. We recruit people very easily here, people who can get their money through the individual grants and incentive grants. We don't have so much support for the infrastructure, for the expensive equipment, which I know comes through the National Center for Research Resources, or for important areas that are developing right now like imaging. The ability to do imaging studies goes very much in parallel with the biological approach to disease treatment. For example, being able to take a mouse that you are trying a drug that might treat Parkinson's or Alzheimer's; keeping that mouse alive and seeing what goes on in the brain requires imaging techniques that aren't widely available. So, that is an area that I hope will continue to get attention. I know it has more recently. I have actually been on the council for that center. I think that's a very important direction for funding. Thank you.

Senator WYDEN. The grants and imaging are important for NCI, NIH and others. Are there other areas besides imaging that you would like to do?

Dr. KOHLER. I think heavy equipment in general is a very important area. We're getting to the point now with this whole bioinformatics area that correlating the clinical information with the genetic is going to become increasingly important. That will require a combination of hardware and software which is not fully yet developed.

Senator WYDEN. I am very interested in working with you. You probably saw the announcement just a couple of days ago about the Mayo Clinic where they are going to take essentially the genetic information they have on thousands and thousands of people and pull it into their files. I think we are seeing in the private sector exactly the kind of efforts you are talking about to provide these links involving genetics.

Dr. KOHLER. If I could add something that you can do that doesn't cost money but is a big issue. As we're looking at the HIPAA implementation and the privacy steps that need to go with that, we, of course, want to protect individual data as much as we can, but we want to make sure we can use it to advance cures and prevention. So, it's important that the Privacy Act not impede research. And trying to make sure we have policies that make that logical are very important to us.

Senator WYDEN. I will work with you on those HIPAA issues. As you know, those are matters that people feel very strongly about. I want to get with Senator Allen. His capable staff is here. As you know, the changes that the President made in HIPAA that were announced recently are very controversial and are matters with respect to individual's information that can now be made available without their consent. It is going to be very contentious.

The point that you are making about how to address these HIPAA issues in a way so as to ensure research and at the same time protect the rights of individuals is very important. I want to get with Senator Allen. This is an area we are going to spend some time talking about and looking at.

On another front, you all have made lots of headway in terms of biotechnology in healthcare issues. What we also know is that these kinds of advances rely on discoveries in other disciplines: engineering and computer sciences, in particular.

I would be interested if we can get you into this also, Mr. Pernsteiner. What is underway at Oregon Health Sciences University and at Portland State to try to ensure that we are enhancing our capability in these other scientific fields as well so as to ensure our best prospects of being successful?

Dr. KOHLER. I will just make a comment and turn it over to Mr. Pernsteiner.

The interface between scientific disciplines is often the area where the greatest discoveries occur. Applying techniques from one to another is a way where we can make advances that would not occur otherwise.

This is the reason that the collaboration with PSU, OSU and the other components of higher ed and the Oregon Graduate Institute are extremely important in terms of advancing bioscience. Data base management is an area of bio-informatics which requires prodigious storage capacity. If the genome has three billion pieces of information, you have to go into some computer storage area to

compare normal to abnormal. This is quite a feat technologically. It's the engineering, the computer science applications that are going to allow bioscience to move forward.

The other thing is that so much of what we are going to be doing in the future in terms of diagnostics, as well as therapeutics, is going to rely on chip technology. OGI, for example, has a chip making capacity that could be used for biologicals that our genetics people said, "Gee, we didn't know you could approach it that way." The people in high tech have been using it all along. It doesn't matter whether it's silicon or whether it's biological.

So, I think, again, this interface and the mergers and collaborations we can achieve are going to advance the field much more rapidly.

Mr. PERNSTEINER. Thank you. A couple of notes here. This state has made an investment in doubling the number of engineers and improving the engineering education throughout the state. And part of the reason that we have seen this major increase in the number of students majoring in engineering, and computer science has been because of the investment of the state.

What that has meant is we have been able to hire significant numbers of additional faculty. We have been able then to use those faculty; they have been using their time also to do research since many of the areas that Dr. Kohler talked about, some of them focus on bio-informatics, computer security, and biological information. We have between us—between OHSU and PSU, our Internet link to the world is a joint one. Our computer science departments at Portland State and at the OGI work closely together and basically have a common curriculum and a common approach to dealing with both students and research.

I think one thing that we found at PSU over the years is that we have focused for 30 some years on the interdisciplinary aspects of science, both in environmental science, physical sciences, and biological science. We are beginning to see also the bringing in of engineering into all those same areas. We are facilitating that in every way that we can, both ourselves and in conjunction with OHSU, but the state's investment in engineering education has helped us have money to make that happen.

Senator WYDEN. Mr. Pernsteiner, you talked about increased federal funding for scientific R&D. This is something that our Subcommittee, Senator Allen, myself, our Subcommittee had made a special focus of our work and certainly will support the development of federal research facilities as well as other matters that you touched on. I think it would be helpful to understand where Portland State would like to go. Are you all looking to have a federal laboratory in Portland? Is this your judgment about where a new Federal effort ought to be?

Mr. PERNSTEINER. Mr. Chairman, actually, I have not thought of that myself. It's actually a wonderful idea. What we had been looking at is assistance in building the capacity, both in terms of facilities and equipment and ongoing faculty grants, but this is news to me. It sounds intriguing.

Senator WYDEN. Well, I was a little bit unclear where you all were hoping to head. We can have more discussions about that. I think what we would like to know is where you think the new fed-

eral effort can best be focused, and we can certainly have other discussions on that.

Another question for OHSU and Portland State as well. We obviously know that the lack of a large base of well trained biotechnology workers from lab technicians to Ph.Ds to post-docs is a factor in our ability to grow and to build the biotechnology industry that we want. Tell us a little bit about what your institutions are doing to build that biotechnology work force that is going to be so important.

Dr. KOHLER. May I make one comment about your last question before we move to that?

Senator WYDEN. Sure.

Dr. KOHLER. We have been talking to our friends at Pacific Northwest National Laboratories about collaboration with them. They have equipment there that is very attractive for some of the things we want to do. We would love some of it to be closer geographically to us in the Portland metropolitan area. I know Andrew Roberts is in the room, or was, and he might want to comment on that later on as well. But I think, again, access to this very important equipment is a key ingredient in making sure that we can move forward.

With regard to the work force issue, we are working with a variety of educational institutions to try and make sure we create the right kind of work force. That includes community colleges, the system at large. As we have expanded our work force so substantially over the last seven years, we have had to either recruit or retrain people who are qualified laboratory workers. It is something of great interest to educational institutions in the area, and this includes community colleges around the State as well as in the Portland metropolitan area, providing a training program that would qualify people to go into the laboratory and take these jobs which are relatively well paying. So, there is a great deal of interest there.

There are curriculums that have been created. George can comment on Portland State, but I know Portland Community College, for example, has a program to train people.

Mr. PERNSTEINER. Thank you, Senator. As has been mentioned, PCC does indeed have an Associate's Degree that I think pertains directly to this. We try to, as I mentioned before, focus on the areas of middle school, high school teacher training, and then baccalaureate and graduate degrees. We think that the work force involved in this, as with the work force we have seen in high tech, covers a whole variety of types of jobs that requires different levels of training and education in different disciplines.

But what our focus has been is to try to increase the number of people who have the Baccalaureate and Master's level education in engineering and science. And we have had, I think, pretty good success in the last several years in building that enrollment. And then we want to keep that up, which is why we're having programs in the middle schools and high schools as well.

Senator WYDEN. Mr. Mazziotti, with a full two hours to prepare for what you were told would be the question, talk to me about the number of jobs that we can tell our constituents, the people of Oregon, at a time when there is so much concern about the economy

where we are headed, where the jobs are going to come from. Give us your best estimate at this point in terms of where the jobs are, how many, what fields. Paint the economic picture in just as detailed a way as you can.

Mr. MAZZIOTTI. Senator, I appreciate the license that you have given me. My estimates are based on some assumptions, and the assumptions are critical. So, I would like to just review those quickly.

One of the assumptions is that we are, in fact, successful in securing the funding necessary to build the infrastructure which is essential for the development itself to occur.

So, for example, I am assuming that we will be able to identify within the Service Transportation Act reauthorization of ISTEA, a significant amount of federal assistance for transportation improvements that qualify on North Macadam.

I am assuming that we will be successful in securing several hundred million dollars in federal tax credit allocation to fuel the private sector investment necessary to generate the tax increment dollars which are essential for the long run to build the district out.

Third, I'm assuming that the institutional configuration that has been mentioned here by Dr. Kohler, anticipated by George Pernsteiner, described a bit by Gil Kelley, comes together, that in fact, we have the opportunity to bring first to OHSU as the anchor tenant, if you will to that district, followed by OGI and Portland State and Oregon State and certainly other institutions.

Now, if all of those easy things are done, then I think that in the first 3 years of this development—and let's start with right now, from 2002 to 2005. It is possible to consider that there would be somewhere around 6,000 jobs created in that timeframe—permanent, full-time jobs in a whole number of sectors, which I will talk to in a moment, excluding the construction work which, of course, would be necessary. And there, we are probably talking about 800 to 1,200 construction jobs during that first initial phase of construction of a middle district, if you will, of North Macadam.

Senator WYDEN. What kind of positions are they?

Mr. MAZZIOTTI. Well, Peter probably can speak to that better than I can certainly for OHSU, but we would estimate that at their build out—at least build out of their first phase, which is a 300,000 square foot administrative and related dry research activity, that somewhere between 2,200 and 3,200 jobs could be accommodated at that location once buildout occurs. I would have to refer to Dr. Kohler because he's got to sign each one of those checks, which is a prodigious task. Then there is 150,000——

Senator WYDEN. I will help him sign the checks.

Mr. MAZZIOTTI. There you go.

Senator WYDEN. If Oregonians are going to get family wage employment, we can get a good bipartisan effort toward signing the checks.

Mr. MAZZIOTTI. And these are good family wage jobs that will average somewhere around $55,000 a year as an average for this area.

Then, there will be 150,000 square foot—this is in the first 3 years of bioscience—office space, public and private space to accommodate both spin outs from the patent and technology transfer pro-

gram that OHSU has generated, but also some in-house office space will be necessary for special grant project programs. That would be as many as 1,500 jobs.

Third, there would be 175 units of market rate condominiums which would accommodate about 50 jobs, 200 units of mixed income apartments, which is about 30,000 square feet which would require another 50 full-time positions to support that facility. There would be 30,000 square feet for a biotechnology incubator center that would be all private, assuming that we can get the private capital necessary to generate it, and there we are talking around 3 to 400 private sector permanent jobs. 25,000 square feet, at least, of retail for supporting services in the surrounding area for another 150 jobs.

So, we're talking about a variety of jobs, an average of about 50 to $55,000 a year in terms of income, which is considerably above the national average for a total of about 6,000 jobs in the first 3 years of this development.

Now, when you look at the long term, the estimates that we have gotten from Metro, for example, on the assumptions they have made in the 20/40 plan will be an office for 10,000 full-time jobs in this area in the next 10 years. They are also looking at somewhere between 3,000 and 4,000 new residents—permanent residents in the area. We think that may be a bit modest depending on how the housing market responds. We are talking about the development of 28 square blocks—square city blocks of space in that 10-year period.

This is the largest development project that Portland will have ever undertaken in any period of time, and it is going to require that we orchestrate all of this very effectively. If you would like to assume leadership of that, that would be wonderful.

Senator WYDEN. That is, in effect, why we are here. I didn't want to come and bring the Subcommittee to exercise my larynx. I wanted to do it because this seems to me to be an opportunity that goes into the history books. This is a time when a lot of Oregon is really hurting, a lot of Oregon; everywhere I go. I made mention earlier about the community meetings, the open meetings. That is what people are looking for, some new economic lifelines. Clearly, the strategies are different in different communities. But I think that the idea of really lasering in on the opportunities for biotechnology that was the answer that I hoped to get from you. And I think it is fair to say it is based on a hunch and assumptions, and I wrote those down.

As you know, I served on the Environment and Public Works Committee. We are already beginning our efforts to look at what the surface transportation reauthorization ought to look like. I will be working very closely with you and the Mayor and Mr. Kelley, in particular, so that we wring out of that Surface Transportation Act every single dollar and every opportunity we have in order to promote biotechnology and the types of projects that you are talking about. So, that was very helpful.

Take a minute, if you would, Mr. Mazziotti, to talk about the environmental cleanup questions for the private property owners. What are we looking at in terms of cost here? And again, to the

extent you can be as specific as you can, given the information you have, the assumptions that have to be made, that would be helpful.

Mr. MAZZIOTTI. I appreciate that opportunity, Senator. As you may know, there are 21 major property owners in this area, some of them holding large parcels 20, 30 acres which is, of course, very unusual for, in effect, a central city location of contiguous owners. But you have there Schnitzer Investment, ZRC Realty, U.S. Bank Trust, North Macadam Investors. They are occupying together about 60 acres of land which is in the northern part of North Macadam, which at one time or another was either the host to a variety of industrial uses that used caustic materials and processes, or they were part of the Liberty Shipbuilding process in World War II that ZRC Realty have already settled with the Navy and EPA on cleanup issues related to that part of their history.

But we're looking at a very big number in terms of the environmental cleanup in the first 10-year process. We would guess that there is $50 million of cleanup that's necessary. That $50 million figure is frankly, both a public and private number because obviously, the owners are primarily responsible if the proximate cause can be demonstrated. Most of them have acted very responsibly, but they are going to need, frankly, assistance to bring their land up to standard. And so, we are working to get supplemental assistance for tier two or stage two environmental assessments completed on the properties as we work through the development plan.

But the number is big. It's not impossible. The recent legislation for brownfields could be of great help to us, and we intend to pursue that in tandem with the property owners so that we can capture enough to begin the cleanup process, and I trust that you will help us there.

Senator WYDEN. There are several brownfields initiatives that are moving through the Congress. We examined the Jeffords Bill recently in the Environment and Public Works Committee. Let me say again this is an area where I plan to work with you on an ongoing basis. This effort is central to the issue that was talked about earlier, and that is keeping this effort to promote biotechnology in sync with the clean Oregon tradition. We are not going to compromise in terms of environmental protection or quality of life issues. I know that is your view as well.

Just one last question, Dr. Kohler. There has been at length some discussion of the question of wet lab space. And I think most of America probably would not be aware of wet labs even are, but apparently, it has been cited as a challenge for you. I understand that the Oregon Opportunity Fund is going to possibly be making dollars available to remove that obstacle. I want to know if that actually is the case, and where do we stand on that?

Dr. KOHLER. Well, again, this relates to the vote that's coming before the public in May, Measure 11. The wet lab space, for purposes of definition, is laboratory space that includes running water, a few of those things that you would need to handle hazardous chemicals, the traditional laboratory, whereas dry lab might have computer activity going in there, but there is no need for the various utilities to be added to it.

The wet lab space is what we're critically short of right now. It keeps us from actually hiring and recruiting people. We have

talked about the need even to find some temporary housing right away before building can be started. But what will happen with the bond vote is that we will actually launch construction of a building, if it's approved by the City, on the hill to accommodate these various laboratory needs that we have. That would start almost immediately as we are working on what can occur on North Macadam.

Senator WYDEN. That is, in your view, and again, I was asking because I am not completely clear on that, will be best boosted by the other Ballot Measure that is——

Dr. KOHLER. 11.

Senator WYDEN.—Ballot Measure 11, with 10 being the question of promoting research.

All right. Anything you gentlemen want to add further?

Dr. KOHLER. Can I say something that's a little bit off the point here?

Senator WYDEN. You can, and I will have some concluding remarks as well.

Dr. KOHLER. I want to make this very brief. In addition to what else can go on in North Macadam, I think there are exciting educational opportunities down there that will complement the others.

Again, the advantages of having the education in proximity to the research is substantial. That's the reason rapid transportation back and forth is important. We see that as a place for something like a regional dental school in the future, for example, as well as what we currently have on the hill.

Senator WYDEN. Well, you all have made an excellent contribution, and it leaves me with great pride to have a chance to reflect for a minute or two on what you have said. Dr. Kohler, people from around the country talk to me about some of the pioneering research that goes on at the Oregon Health Sciences University, building on a tradition, by the way, that Senator Hatfield did so much to promote. Now, we are going to take it to another level with biotechnology, with the focus on cancer and neurosciences and the areas that you have touched on.

I think that is very helpful, and particularly to see you teaming up with Portland State in the way that you have described and Dr. Bernstine's interest makes a huge difference as well, as you both know.

In a decent chunk of the country, it can be pretty hard to get the universities to get to the same table to work together on substantive matters. The fact that the two of you are so interested and Dr. Bernstine has a great interest in this field is, I think, is a very big plus and leaves me feeling very good about what we have heard at that side of the table.

Mr. Mazziotti, the fact that you have walked us through the economic possibilities here, and what this can mean for Oregon when we are hit so hard economically, is an important way to wrap up.

Once again, we are showing up on the list of the top 10 places in the country to live. I think there a couple of the national publications that have us right up there on issues that are on the newsstand now. What you have laid out is essentially a game plan that the city wants to follow to ensure that we can bring thousands of good family wage jobs to Portland, to the State of Oregon, and do it in line with the priorities that we have had in the State, prior-

ities we have certainly had since I have been here—I came to Oregon 30 years ago—that were laid out by the Republican Governor Tom McCall, who said that we can have the quality of life that people in this state want and do it in line with the tradition of economic opportunity as well.

We are going to pull out all the stops to make this work and to bring together the various industries, universities, and governmental bodies to do it in line where we can show the taxpayers that we are being very tough-minded in terms of the way their dollars are being used, that we are being cost effective.

I know the Mayor and Gil Kelley answered that question I asked in a thoughtful way. We do not want this project to go down as one where people fritter away a lot of money. We want it to go down as one where people say this was a model for using taxpayer's dollars effectively to make a great difference.

There is a lot of work to be done here, but it is work. It is high stakes work at a high stakes time. I thank you for the excellent presentations you have given this Subcommittee, which I am proud to be chair of, a sense of what it is going to take to make a program like this work for Portland, but also to be a national kind of model.

Thank you very much for your contributions. We will be working with you in the days ahead. We will excuse you at this time. The Subcommittee is adjourned.

[Whereupon, at 11:37 a.m., the hearing was adjourned.]

APPENDIX

PREPARED STATEMENT OF JOANNA RODGERS, EUGENE, OREGON

I am writing in response to the testimony that Senator Ron Wyden gave on April 5, 2002 regarding the future of biotechnology in Oregon. Unlike Senator Wyden, I strongly oppose any legislation or measure which will encourage such development. There are many reasons for this and I will outline a few below.

Not too long ago, I was like most people when it comes to biotechnology: indifferent or, if anything, hopeful. But I have had a quick education in this area that led me to first understand on an intellectual level the hazards of biotechnology and then to feel the fear of this growing danger on a gut-level. It is being touted as a cure to many of the problems we face today such as disease, starvation, and scarce resources. While these benefits sound unarguable, the dangers (real and projected) are large enough to merit much caution.

Basically, we simply do not know what exactly genetically engineered products may do. Many experiments have predicted outcomes which do indeed come true—except for one or two individuals. These "exceptions to the rule" are all that it takes to have things get beyond our control and wreak irreversible damage. This is true for genetically-engineered food as well as other products such as trees.

Genetically-altered foods are already being consumed at an enormous rate—in fact, more than half the food found on grocery shelves contain genetically modified ingredients. Study after study, experiment after experiment, and product after product have demonstrated that when it comes to biotechnology, one needs to expect the unexpected. However, many of the ill effects are already known. For example, several toxins have been found in foods containing G.E. foods, an increased resistance to antibiotics is possible due to the 'marker genes' utilized in G.E. foods, new diseases can be created by the new strains of viruses and bacteria used, and an increased rate of cancer is also developing (particularly due to the genetically modified growth hormone used in cows).

Biotechnology is a fast-growing field which threatens much more than is commonly recognized. The potential benefits of this development are touted while the serious potential impacts are hardly acknowledged. In my opinion, this is the ultimate sell-out of our humanity in the name of progress and economic gain. While biotech corporations and related industries have everything to gain, society and indeed life on Earth as we know it has everything to lose. The fact of the matter is that we do not know what, exactly, our bio-engineered products will do. While some would say that this is all the more reason to try it out and see how it works, in my opinion, we need to err on the side of caution. We are literally talking about rearranging the building blocks of life which have taken eons to form. We are not operating on the time scale that nature has for our trial and errors. While the immediate impacts may seem inconsequential (e.g., some cell mutation in a tomato that has pig cells spliced in), the long-term or more insidious results may not be knowable now.

Senator Wyden said in his testimony that, "No one disputes that biotechnology is an industry with a bright future." I dispute this. In fact, I would say that it could be a very dark future for us if the biotechnology industry is allowed to grow. We cannot continue to make a healthy economy the bottom-line when the trade-off is an unhealthy people and environment.

Thank you for your time and consideration of my thoughts. I truly hope that this letter will count for something to counter the many other voices that are voicing just the economic and one-sided positive potentials of biotechnology.

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